The
IRON AGE

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Vol. 163, No. 19 May 12, 1949

Editorial

Full Employment 75

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Technical Articles

Brass and Bronze Forgings 78
Desulfurizing Hot Metal 83
When and How to Use Carbide Insert Cutting Tools 84
Thickness Tester For Tinplate Coatings 89
AFS Meeting Report 90
Culling Hydraulic Pump Gears 94
Intermittent Oxygen Enrichment of the Cupola Blast 96
Straightening Shafts 100
New Equipment 101

o o o

Features

Fatigue Cracks 62
Dear Editor 64
Newsfront 77
Assembly Line 108
Washington 112
West Coast 116
Personals 120
European Letter 126
Industrial News Summary 131
News of Industry 133

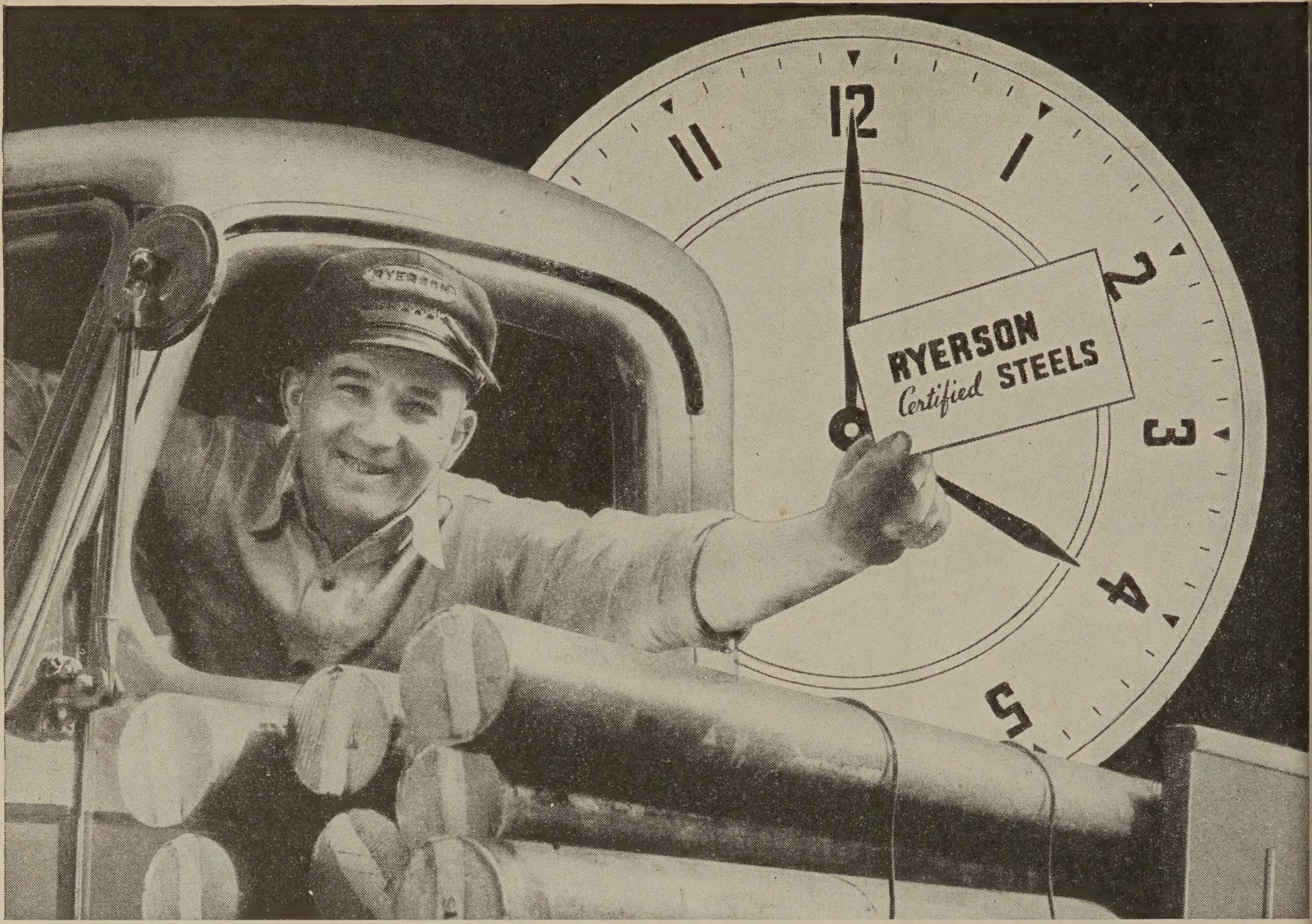
o o o

News and Markets

Liberian Mining Interest Gets Credit 135
Industrial Briefs 136
Linepipe Supply Seen Remaining Tight 137
Finished Steel Composite Price Change 139
Less Farm Buying Threat to Steel 141
Norway Studying American Industry 143
Machine Tool Developments 172
Nonferrous News and Prices 174
Iron and Steel Scrap News and Prices 177
Comparison of Prices by Week and Year 180
Finished and Semifinished Steel Prices 182
Alloy Steel Prices 183
Pipe and Tubing Prices 184
Warehouse Steel and Pig Iron Prices 185
Ferroalloy Prices 186

o o o

Index to Advertisers 212
Dear Customer 213



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Full Employment

LET'S skip the argument as to when it will happen and how far it will go. An impressive array of statistics, molded by persuasive logic, can be summoned to prove that business will shortly go into a tailspin. An equally plausible case can be briefed for the other side.

Depressions are not a new experience. We have had them since annals were first written. If certain students who claim these fluctuations to be the manifestations of profound cosmic forces are right, then modern changes in business are merely the present expression of the same causes which brought seven fat and seven lean years to Joseph and the people of Egypt.

However, something new has been added. We are told that the vagaries of present day life are a blight that is peculiar to capitalism. If five or ten per cent of the labor force loses its jobs, if prices decline, if personal incomes drop, if stocks depreciate, if earnings melt away—these are all the unique infirmities of a free society.

The precise links in the chain that leads from freedom to the peaks and valleys of the business cycle have been traced, usually positively, in several hundred distinct quasi-scientific demonstrations. The most pretentious, the most elaborate, and the most dogmatic of these diagnoses is the one set forth by Karl Marx in *Das Kapital.*

Marx predicted a final, climactic depression which would mark the end of capitalism. The communists have been eagerly awaiting this day of democratic doom and in the meantime doing what they could to hasten its arrival and insure its finality. Their chant "The next depression will be the last" has been taken up by a host of neo-liberals.

So deeply has this proposition penetrated our thinking that many students who detest communism nevertheless believe that our society cannot endure another depression. Free enterprise has become a delicate hothouse flower which can bloom only under conditions of "full employment." Whenever men become idle it is necessary for the state to step in and qualify that freedom in order that no one shall go jobless.

It is this capitulation to unproved socialist dogma that confronts us with our major issue rather than the decline in steel operations, department store sales and corporate profits which many economists believe to be imminent. We doubt that it is possible to have a society in which one part of the economy is operated by the state for the primary purpose of creating employment while the rest of the economy is operated by private management under the imperative business rule that income must meet all costs plus replacement of exhausted equipment and a fair return on invested capital.

Under a private economy this rule must be satisfied in order to survive. Employment is an incident and not a primary objective. The worker can insure his employment only by turning out a product which in quantity and quality will command a priority in the market place that will enable the business to meet the requirement of full cost satisfaction. When the state steps in to operate a business for employment only and ignores the rule of full cost recovery, the pressure on the worker and management disappear, incentive vanishes, discipline ceases, efficiency declines, and the economy begins to slip to lower, stagnant levels.

"Full employment" carries a hidden and ominous price.

Joseph Stagg Lawrence

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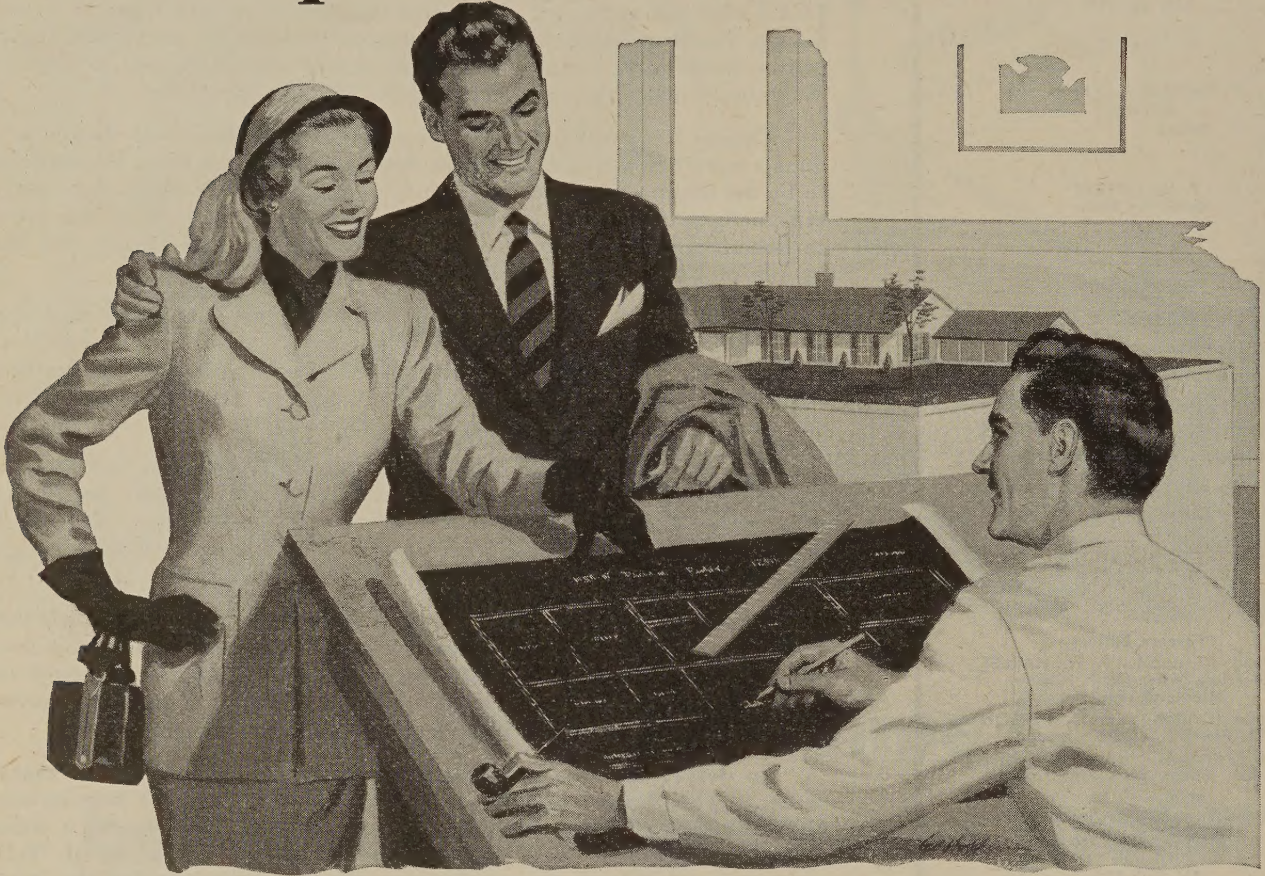

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METALLURGY SALES OPERATIONS

The IRON AGE

May 10, 1949

NEWSFRONT

► Next to new orders inventories are today the No. 1 question in manufacturing operations, hence the hot haste to reduce banks of parts and raw materials. A prominent Detroit manufacturer who recently completed an extensive investigation of the subject has estimated that a reduction of 10 pct in the value of his inventory will completely eliminate all profit on operations.

► It is believed that a lot of steel being bought now is a hedge against a long coal strike or steel labor trouble. If there is no enforced stoppage in steel production some steel users may have a big inventory in relation to their orders. A decrease in value of inventory, without decreasing quantity, could hurt here too.

► Steel mills are buying big tonnages of coking quality coal from commercial mines, some of it coming a long way by rail. In other words they are spending hard cash to strengthen their position in coal bargaining this summer.

► A significant difference between the labor situation today and that existing during the past few years is that management can no longer just pass the increase along to the customer. As a result, either labor won't get what it asks this summer, or management will have to take any wage boost granted out of profits. This time the consumer's position is better marketwise and it is felt he won't foot the bill.

A new union tactic is attendance at stockholders' meetings. The auto union now holds at least one share of stock in 68 firms making auto bodies and parts. Union people attend stockholders' meetings merely to see first hand what goes on. They have already attended meetings at Packard and Chrysler.

► Electric furnace operations will not fall off in proportion to the decline in alloy, stainless and conversion steels. The collapse in scrap prices means many will be used in preference to openhearths on rimmed and semi-killed steels.

► At least one large European steel producer who had expected a long period of near capacity operations now takes a more glum viewpoint. Unhappily, says the company, obstacles encountered previously from coke and iron ore supply have been replaced by difficulties in the sale of our products. These difficulties threaten to become very serious. This company, which was depending heavily on the international market, cites increasing competition from new producers in the world who benefit from low cost operation.

► A question some metallurgists are asking themselves today is whether or not growing pressures to limit the quantity of manganese and chromium in alloy steels will eventually force the return of "needled" steels containing boron.

► Since several railroad carbuilding shops will run out of orders by the end of next month steel company traffic men are again worrying about a future shortage of gondolas. The gondola population is still declining and when steel business is high the shortage forces some involuntary diversion to trucks.

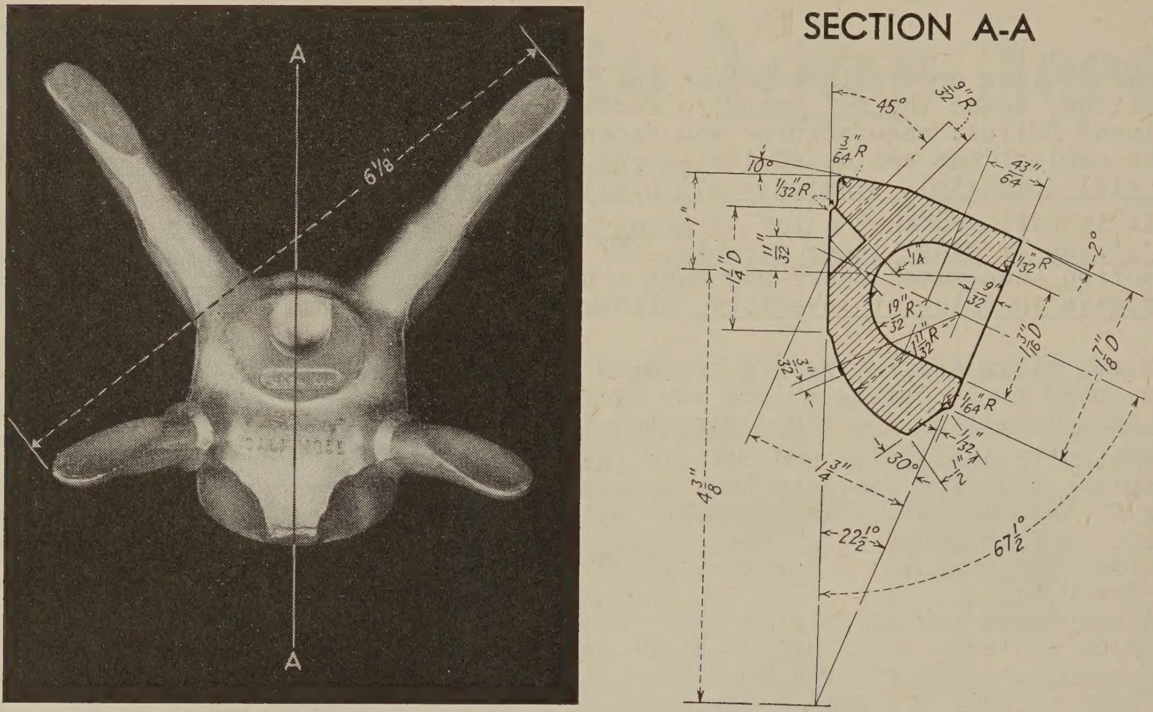
► Ford engineers have calculated that reductions in wind resistance and weight in the '49 Ford have resulted in a decrease of 30 pct in the horsepower required to drive the car 60 mph. Ford claims this improvement is reflected in better fuel economy and faster acceleration.

► Makers of dies for the rubber molding industry are searching for better materials. The evolution has been from a straight steel mold to steel plated with brass. The latest innovation is to form the dies from brass or copper clad steel. Brass and copper permit a better bond with the rubber and thus produce more perfect moldings.

► Steel buyers learned a lot about specifications and about their suppliers during the war. This knowledge, plus a cost cutting campaign, is keeping steel salesmen on their toes. It forced them to use their price books more often during the past few weeks than they did in the last 8 years.

► The proposed 130-mile, $210 million belt conveyor between Lake Erie and the Ohio River is a dead duck--at least for the time being. It died in the House Commerce and Transportation Committee of the Ohio Legislature, which voted to postpone it indefinitely. Although blessed by the governor, the rubber railroad melted under fire from railroads, brotherhoods and lobbyists.

An Engineering, Metallurgical and Cost-Price Guide for


A
6⅛"
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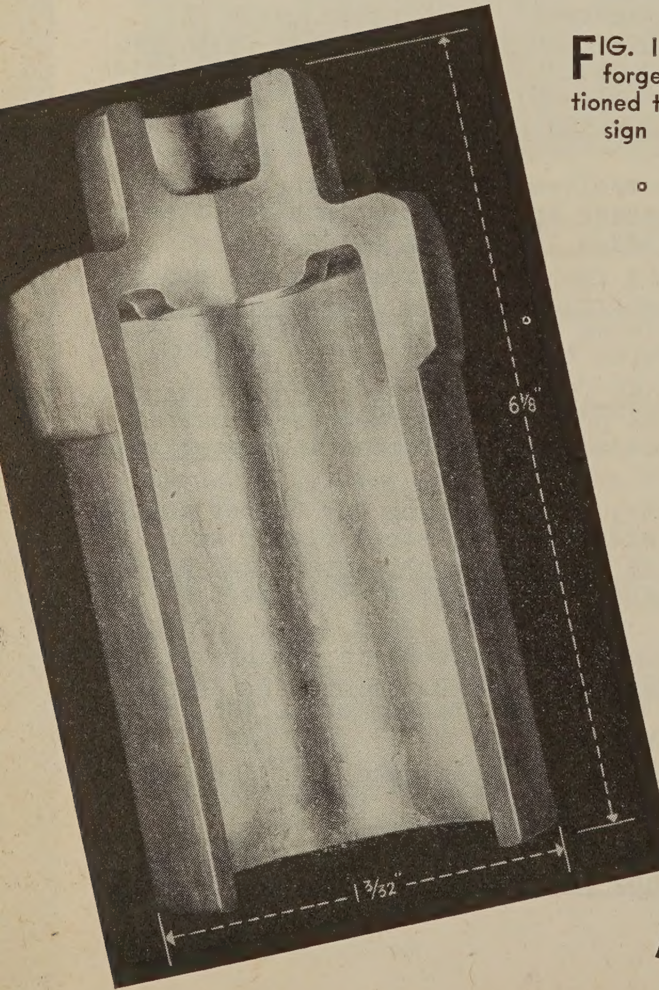
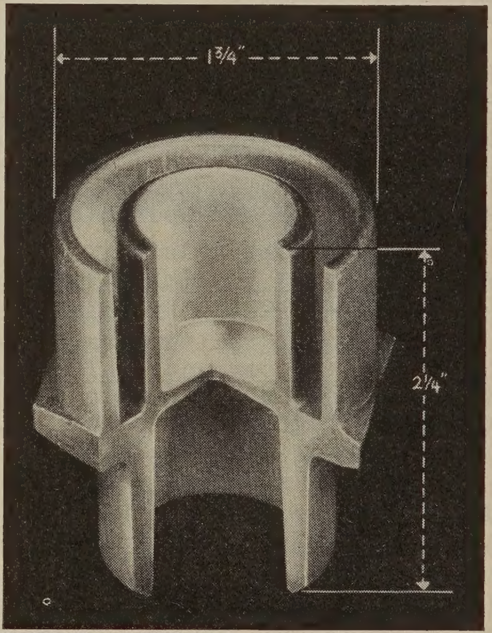
SECTION A-A
45°
9/32" R
3/64" R
10°
1/32" R
43/64"
1"
11/32"
1/4 A
1/32" R
2°
1¼" D
9/32"
19/32" R
11/32" R
3/16" D
7/8" D
3/32"
1/64" R
1/32"
30°
½" A
1¾"
4⅜"
22½°
67½°





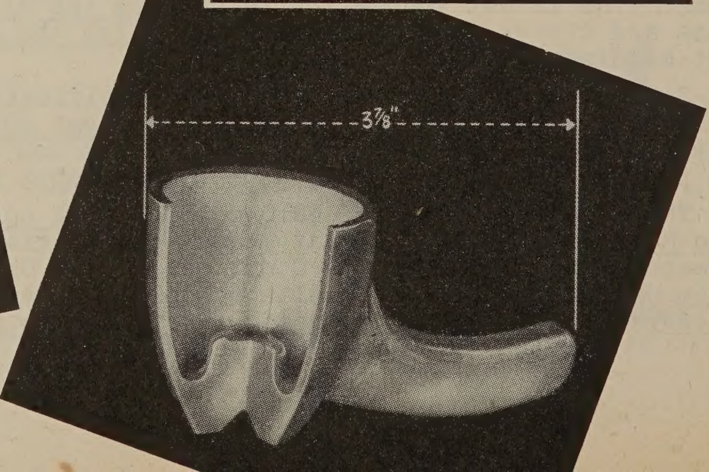


FIG. 1—Examples of forged parts, sectioned to indicate design possibilities.

Brass and Bronze Forgings

Copper-base metal parts requiring a dense, uniform structure and a high-grade surface finish can often be produced economically by forging. The author discusses the inherent advantages of forgings, the engineering and metallurgical factors involved in forgings, and provides a general cost guide applicable to the average forged part.

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By H. C. WARD
Manager, Cost Division,
Titan Metal Mfg. Co.,
Bellefonte, Pa.

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HOT-PRESSED brass and bronze forgings offer a number of advantages to users of copper-base parts. Improvements in forging technique have, in many cases, made such parts desirable from the standpoints of both price and quality.

The purpose of this article is to make cost data available so that design engineers can quickly approximate the cost of brass and bronze forgings, and to present metallurgical and design data of interest and assistance to engineering personnel not fully acquainted with brass and bronze forgings and with forging technique.

There is considerable evidence to support the premise that many applications where forgings can and should be used are now being overlooked. For example, figures from the Dept. of Commerce show that during 1946 there were over 974 million lb of copper and copper-base sand castings produced in the United States. During 1947, there were over 960 million lb produced, and during the first ten months of 1948 there were over 773 million lb produced. These tonnages of sand castings, after adjusting for those parts that should be produced in sand, must contain annually many thousands of tons of parts requiring a dense, uniform metal structure and a high-grade surface finish, qualities that are inherent

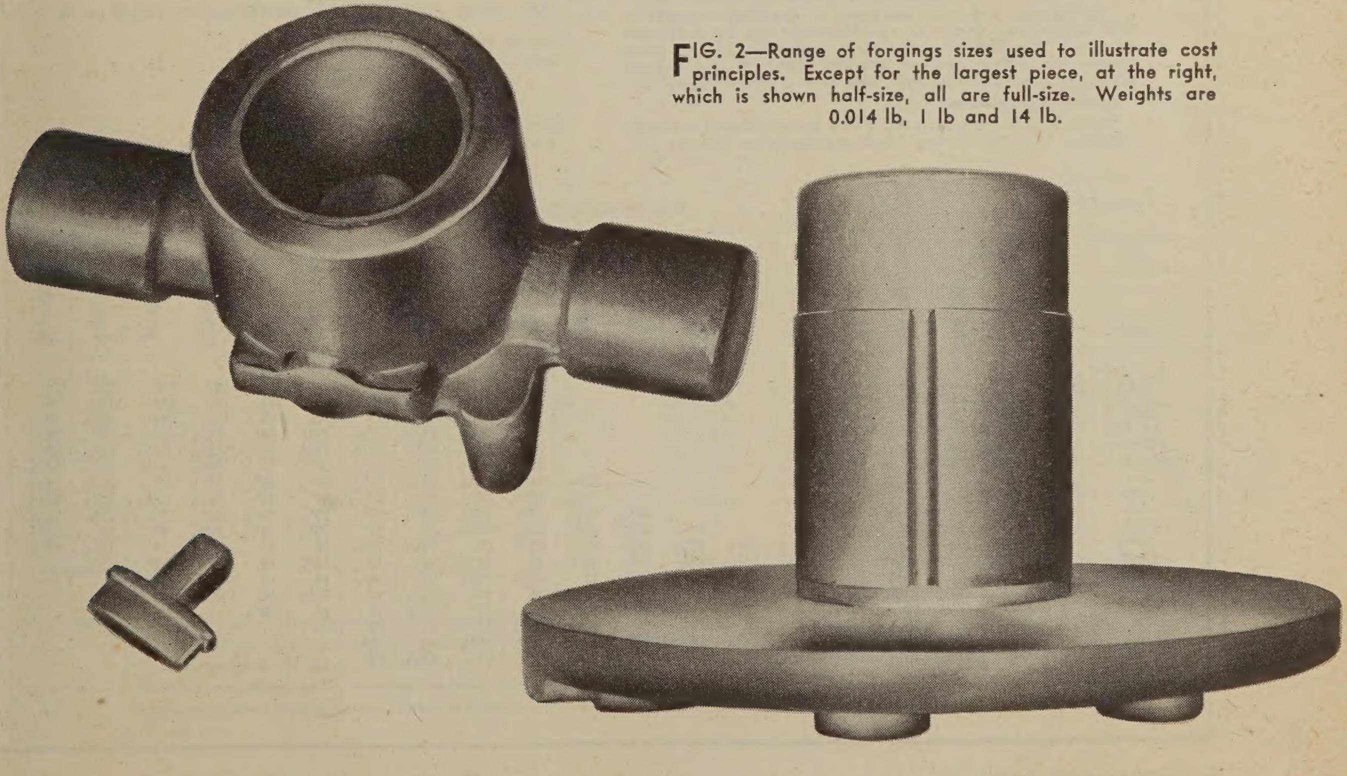


FIG. 2—Range of forgings sizes used to illustrate cost principles. Except for the largest piece, at the right, which is shown half-size, all are full-size. Weights are 0.014 lb, 1 lb and 14 lb.

in forgings and which can often be supplied most economically by that process. This opinion is supported by the fact that some operators of captive sand foundries have switched many such parts to forging shops.

Hot-forged parts have a number of advantages over the same parts produced as sand castings. The major advantages are as follows:

(1) Less finishing costs prior to plating.

(2) Less scrap produced during production of the original product and during subsequent machining and finishing.

(3) Greater uniformity in mixture and dimensions, resulting in faster chucking, better machinability, and higher machine feeds and speeds.

(4) Closer tolerances, often making it possible to eliminate sizing operations and still maintain desired limits. Threads, in many instances, can be chased on a forging without preliminary forming.

(5) Greater tool life. There are no sand inclusions and blow holes in forgings to wear out tools quickly.

(6) Better mechanical properties. Because of superior physical qualities, thinner sections can be used in forgings.

(7) Letters and numerals as forged on parts are clean, clear-cut and attractive.

(8) Forgings have consistently superior finish over sand castings, resulting in more eye appeal and greater salability in the end product.

It is also worthy of note that during recent years many advancements have been made not only in forging press equipment, but in forging die design and technique. These advancements have made it possible to produce difficult shapes economically and to do coring that was not considered possible in the earlier days of the nonferrous forging industry. Examples of present-day technique are illustrated by the as-forged parts shown in fig. 1.

The desirability of providing a device through which engineering and cost departments can make a quick cost check when considering the possible use of brass and bronze forgings is apparent. This, however, is difficult since the cost of a given weight forging may vary considerably from the cost of another forging of the same weight. Some of the reasons for this are: (1) Forgings of the same class and weight rarely require exactly the same amount of gross material. (2) One forging that can be classified as a simple shape will require a special-shaped slug, while another forging of the same class and weight can be made from a slug cut from a simple round extruded bar. (3) Forgings of the same weight may in one case require a slug of very large diameter while in another case may only require a slug of small diameter cut longer, thereby involving a considerable difference in waste and slug-cutting time. (4) Due to differences in design, there is often a considerable difference in die life, and thus in die maintenance cost. (5) Delivery costs will vary with the distance the parts must be shipped.

Thus, it can be seen that any preprepared group of figures set up as a standard might be unfair to either the producer or to the purchaser

TABLE I

Quick Guide for Estimating the Cost of Brass or Bronze Forgings

Forging costs may be found by adding the weight and quantity increments, given below in ¢ per lb, to the rod base price* for the desired copper-base alloy.

The figures are not intended to represent exact or firm prices, and under no consideration can be construed as such. The figures are merely indicative of the price ranges for various sizes of average simple forged shapes, produced from single-cavity dies and trimmed only.

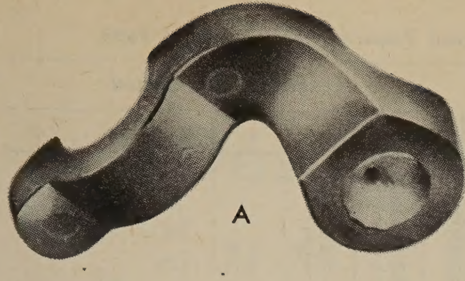
Sample Calculation:

The 1-lb part shown in fig. 2 can be considered a simple forging. Quantity prices for it would be as follows:

	5000 Parts	10,000 Parts	25,000 Parts
Brass Rod Base price ..	29.24¢ per lb	29.24¢ per lb	29.24¢ per lb
Forging Increment	15	14	12
Approxiate or Guide Price..	44.24¢ per lb	43.24¢ per lb	41.24¢ per lb

Forged Part Weight		Quantity Increment—¢ per lb over Rod Base Price*																	
Oz	Lb	100–200	200–300	300–400	400–500	500–750	750–1,000	1,000–2,000	2,000–3,000	3,000–4,000	4,000–5,000	5,000–7,500	7,500–10,000	10,000–15,000	15,000–25,000	25,000–50,000	50,000–75,000	75,000–100,000	Over 100,000
½–⅝	0.031–0.039	......	......	......	......	......	......	......	......	......	......	......	184	179	171	162	156	153	152
⅝–¾	0.039–0.047	......	......	......	......	......	......	......	......	......	......	......	143	130	133	126	122	119	118
¾–1	0.047–0.063	......	......	......	......	......	......	......	......	......	......	118	113	110	105	100	97½	95½	93½
1–1¼	0.063–0.078	......	......	......	......	......	......	......	......	......	99½	96½	92½	89½	86½	81½	80½	76½	75½
1¼–1½	0.078–0.094	......	......	......	......	......	......	......	......	90½	87½	85½	82½	79½	77½	73½	70½	69½	68½
1½–2	0.094–0.125	......	......	......	......	......	......	......	......	68½	65½	64½	61½	60½	58½	56½	54½	54½	53½
2–3	0.125–0.188	......	......	......	......	......	......	......	46½	44½	43½	42½	41½	40½	38½	37½	36½	35½	35½
3–4	0.188–0.250	......	......	......	......	......	......	......	41½	40½	39½	38½	37½	36½	34½	33½	32½	31½	31½
4–6	0.250–0.375	......	......	......	......	......	......	38½	31½	29½	29½	28½	27½	25½	25½	23½	23½	23¼	23¼
6–8	0.375–0.500	......	......	......	......	......	34½	31½	24½	23¼	22¾	22	21	20¼	19¼	18¼	18	18	17½
8–12	0.500–0.750	......	......	......	36½	33½	29½	27½	21¾	20¾	20	19½	18¾	18	17	16	16	15¾	15½
12–16	0.750–1.000	......	......	32½	30½	28½	25½	23½	19	18	17½	17	16	15¾	15	14	13¾	13½	......
....	1.00–1.50	......	27½	25½	23½	22	20	18¼	17	16¾	15¾	15	14¼	14	13	12	11¾	......	......
....	1.50–2.00	......	23½	21¾	20	19	14¾	14½	14½	14	14	13½	13	12½	12	11¼	......	......	......
....	2.0–3.0	22½	20	18¼	17	16	14	13½	13	12	12	11¾	11	11	10¼	......	......	......	......
....	3.0–4.0	22	19	17½	16	15	13	13	12	11¼	11	11	10	10	......	......	......	......	......
....	4.0–5.0	21	18	16½	15½	14¾	12	12	11¼	11	10½	10	9¾	......	......	......	......	......	......
....	5.0 Plus	21½	18½	17	15¾	15	12½	12¼	11½	11	11	10½	10	......	......	......	......	......	......

* As quoted weekly in THE IRON AGE, or available from other sources.



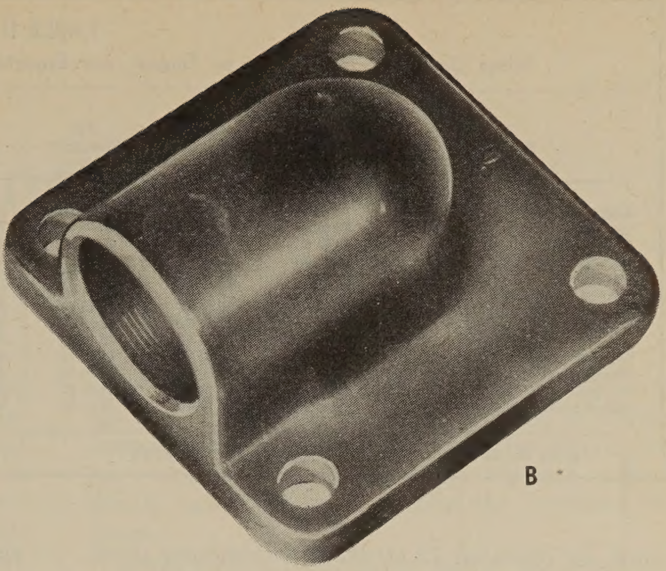


FIG. 3—Both forgings, *A* and *B*, were made on the same press equipment and are shown full-size. *A* is produced 74 pct faster than *B*, but costs 210 pct more per lb due to weight difference.

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in any given instance, if such figures were used for actual pricing purposes. Firm prices should be quoted only after individual cost estimates, based on study of the parts in question by the producer's engineers, have been prepared. However, by basing the figures upon comprehensive cost data and including a representative cross-section of parts in each weight class, it is possible to provide the design engineer and cost accountant with a measuring stick, *for general guidance only,* applicable to the average part. Such a guide is given in table I.

Since it may not be clear why extremely small parts cost more per pound than parts of average size and larger, the following illustrations, based upon the operation of single-cavity dies on crank-type presses, will clarify the question.

The very small forging in fig. 2 weighs 0.014 lb. Seventy-two of these forgings are required to make 1 lb of shipping weight. For 1 lb of forgings, 72 slugs must be cut; a forging press

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FIG. 4—Basic engineering design data, tolerances and terminology applicable to nonferrous forgings.

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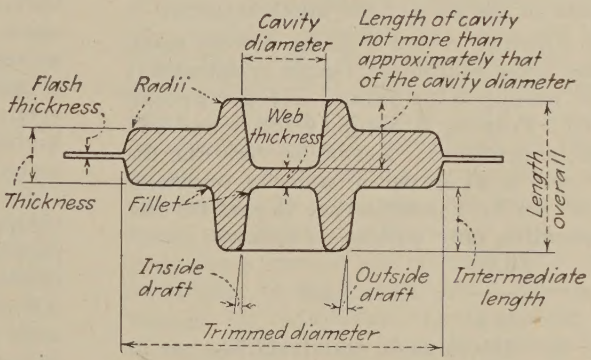

		Regular Brass	Naval Brass	Aluminum Silicon Bronze	Copper	Aluminum Alloys 14-17-18-25-51	Magnesium Alloys JI-FSI-01
Draft—Outside	Hammer Forgings	3° to 7°	3° to 7°	3° to 7°	3° to 7°	3° to 7°	3° to 7°
	Press Forgings	1° to 5°	1° to 5°	1° to 5°	1° to 5°	1° to 5°	1° to 5°
Fillet and Radii		⅛ in.	⅛ in.	⅛ in.	⅛ in.	⅛ in.	⅛ in.
Tolerances Dimensions and Diameter	Up to 1 in. incl.	±0.005 in.	±0.005 in.	±0.007 in.	±0.007 in.	±0.007 in.	±0.007 in.
	Over 1 in. to 2 in. incl.	±0.008 in.	±0.008 in.	±0.010 in.	±0.010 in.	±0.010 in.	±0.010 in.
	Over 2 in. to 4 in. incl.	±0.010 in.	±0.010 in.	±0.015 in.	±0.015 in.	±0.015 in.	±0.015 in.
	Over 4 in. to 6 in. incl.	±0.015 in.	±0.015 in.	±0.020 in.	±0.020 in.	±0.020 in.	±0.020 in.
	Over 6 in.	±0.031 in.	±0.031 in.	±0.03125 in.	±0.03125 in.	±0.03125 in.	±0.03125 in.
Flash Thickness		0.035 in.	0.045 in.	0.080 in.	0.080 in.	0.080 in.	0.100 in.
Web Thickness		3/32 in.	⅛ in.	¼ in.	¼ in.	¼ in.	⅜ in.
Flatness Per Inch		0.005 in.	0.005 in.	0.005 in.	0.005 in.	0.005 in.	0.005 in.

Notes: (1) Inside draft will be somewhat greater than outside draft.
(2) Radius shown is minimum desirable for maximum die life, but fillets of very small radii can sometimes be made.
(3) A minimum of ±0.007 in. tolerance should be allowed for all dimensions affected by the parting line of the forging.
Ordinarily a minimum of 1/32 in. should be added to all surfaces which are to be machined.
Prepared by Brass Forging Section, Copper & Brass Research Assn.

TABLE II

Alloys Commonly Hot-Pressed or Forged, and Expected Physical Properties for the Forged Parts

METAL	Tensile Strength, 1000 psi	Yield Strength, 1000 psi	Pct Elongation in 2 in.	Rockwell Hardness	NOMINAL COMPOSITION					
					Cu	Zn	Sn	Fe	Si	Al
Electrolytic Copper	30 to 38	8 to 10	45 to 50	25 to 65 (F)	99.92	....	....	....	....	....
Deoxidized Copper	30 to 38	8 to 10	45 to 50	25 to 65 (F)	99.94	....	....	....	....	....
Muntz Metal	50 to 65	22 to 30	40 to 50	45 to 60 (B)	60.0	40.0	....	....	....	....
Forging Brass	50 to 65	22 to 30	35 to 50	45 to 60 (B)	60.0	38.0	....	2.0	....	....
Naval Brass	55 to 68	25 to 35	30 to 45	50 to 65 (B)	60.0	39.25	0.75	....	....	....
Leaded Naval Brass	55 to 68	25 to 35	25 to 40	50 to 65 (B)	60.0	37.5	0.75	1.75	....	....
High-Silicon Bronze (A)	50 to 65	18 to 24	50 to 70	35 to 50 (B)	96.0	....	....	....	4.0	....
Low-Silicon Bronze (B)	40 to 55	16 to 22	50 to 70	30 to 45 (F)	97.5	....	1.0	....	1.5	....
Aluminum Bronze	75 to 90	33 to 40	15 to 30	75 to 90 (B)	89.5	*	*	*	....	9.0
Aluminum-Silicon Bronze	90 to 98	65 to 70	15 to 25	85 to 95 (B)	91.0	....	....	....	2.0	7.0
Manganese Bronze (A)	65 to 75	35 to 45	25 to 45	65 to 80 (B)	58.5	39.2	1.0	1.0	....	....
Manganese Bronze (B)	85 to 105	55 to 75	15 to 30	85 to 100 (B)	65.5	23.3	....	3.0	....	4.5
Nickel Silver, 10 pct	90 to 100	35 to 45	20 to 30	65 to 75 (B)	45.0	45.0	....	....	10.0 pct Ni	

* Fe, Sn, Mn, Zn may be present to 1.5 pct, remainder of analysis.

must be operated 72 strokes; a trimming press must be operated 72 strokes; and 72 forgings must be handled through processing, inspection and shipping.

The medium-size forging in fig. 2 weighs 1 lb. To get a pound of these forgings, only 1 slug must be cut; a forging press operated 1 stroke; a trimming press operated 1 stroke; and there is only one piece to handle through processing, inspection and shipping.

The large forging in fig. 2, shown half-size, weighs 14 lb, or exactly the same as one thousand of the very small parts shown in fig. 2. In this case the same weight is obtained from 1 slug. 1 forging press stroke, and 1 trimming press stroke as is realized from 1000 slugs and 1000 press strokes in the case of the small forging.

The two forgings *A* and *B* in fig. 3 were made on the same press equipment (same investment). Forging *A* weighs 0.139 lb and 314 per hr can be produced. Forging *B* weighs 0.753 lb and 180 per hr can be produced. Assuming that the direct labor rate is \$1.50 per hr and the overhead rate is \$4.50 per hr, the difference in cost for the forging operation only will be as follows:

$$\text{Forging } A\text{:}\quad \frac{\$6.00}{314} = 1.91¢ \text{ each}$$

@ 0.139 lb each, cost is 13.74¢ per lb

$$\text{Forging B:}\quad \frac{\$6.00}{180} = 3.33¢ \text{ each}$$

@ 0.753 lb each, cost is 4.42¢ per lb

Thus, it will be noted that on the same press equipment forging *A* is produced 74 pct faster than forging *B*, but that the forging operation for *A*, nevertheless, costs 210 pct more per lb than for *B*, due to the difference in weight.

The foregoing illustrations deal, in each instance, with the production of forgings from single-cavity dies. Where quantities are sufficient to warrant the added investment in dies, many small forgings can be made in dies with multiple cavities. This tends to reduce costs per pound substantially and to make prices more comparable with those applying to medium-weight parts. Moreover, in spite of the great progress that has been made by machine tool builders in supplying the industry with better and faster equipment, producers of nonferrous forgings expect even faster presses and methods of operating that will better serve the trade.

Basic engineering design data, tolerances, terminology, etc., are illustrated in fig. 4. The tolerances given are those normally applicable to parts produced as nonferrous forgings. However, actual tolerances obtainable depend largely upon the details of the particular forging involved. On certain types of parts, where extremely accurate dimensional control is required, even closer tolerances can be provided at slightly higher cost through modern die design, forging technique and quality control.

Progress has likewise been made in the development of better nonferrous forging alloys, making it possible to supply parts with very high physical properties and resistance to corrosion. Alloys commonly hot-pressed or forged along with physical properties obtained with each are shown in table II.

Brass, bronze and nickel silver forgings, ranging in weight from a fraction of an ounce to 100 lb, are being used with great success and economy in such diversified industries as electrical equipment and appliances, plumbing, fittings, refrigeration, automotive, compressed gas equipment, railroad and automotive air brakes, valves, industrial gages, washing machines, builders' and marine hardware, etc., especially in applications calling for high mechanical properties and high-grade surface finishes.

● ● ●

Desulfurizing Hot Metal

A LADLE desulfurizing method said to be the most effective means, on a commercial scale, for bringing molten metal and molten desulfurizer in contact was described at the recent National Open Hearth Steel Committee conference by E. P. Best, plant metallurgist, A. M. Byers Co., Pittsburgh. The method is essentially featured by a reladling operation under controlled conditions and results in a very effective association of molten metal with sodium hydroxide as the desulfurizer, making possible from 90 to 95 pct sulfur removal.

Table I shows results which can be obtained with this method on a daily commercial operation involving production in excess of 1000 tons daily from one unit. The data have been chosen to illustrate the degree of desulfurizing that can be obtained with varying amounts of sulfur in the metal.

Conventional ladle desulfurizing methods, whereby the desulfurizer, generally sodium carbonate, is charged into the ladle either before introducing the metal or charged concurrently with the introduction of the metal, are said to be inadequate since such a procedure does not go far enough in developing desirable association of metal and desulfurizer.

In the Byers' method, the molten iron to be desulfurized is tapped into an open-top conventional lip-pour ladle. As the tapping proceeds, solid sodium hydroxide is simultaneously added at intervals during the tap. The sodium hydroxide melts, forming the desulfurizing slag, and the melting is accomplished by a rather violent reaction which causes the desulfurizer to foam. Some desulfurizing takes place in this ladle, the degree depending upon the amount of sodium hydroxide introduced. The main function of this part of the operation is to melt the sodium hydroxide and bring it up to metal temperature and to condition it through moisture elimination or other gas forming ingredients and thereby eliminate the undesirable foam.

Desulfurizing Cupola Metal With Sodium Hydroxide.
Temperature Range—2500° to 2600° F.

Pct Sulfur Before Desulfurizing	Pct Sulfur After Desulfurizing	Pct Sulfur Eliminated
0.111	0.008	92.8
0.138	0.009	93.5
0.156	0.009	94.2
0.165	0.013	92.1
0.181	0.014	92.3
0.190	0.014	92.6
0.211	0.015	94.1
0.227	0.015	93.4
0.235	0.016	93.2
0.269	0.019	92.9

After the full charge of metal has been introduced into the ladle with the desulfurizer, the molten desulfurizing slag quickly reaches a foam-free condition and a temperature about that of the underlying metal. At this point the contents of the ladle are poured into a second ladle, and the pouring is maintained at such a rate as to cascade the metal and the previously conditioned desulfurizer into the second ladle and thereby develop a very effective intermixing and a high degree of sulfur elimination. As soon as the reladling has been completed, the desulfurizer from the second ladle is removed from the metal.

A special type of hooded ladle is used with a nozzle at a position corresponding to the lip of a regular open-top lip ladle. By tilting the ladle the nozzle functions the same as it does in a bottom-pour ladle. With the desulfurizer lying on top of the metal, only a small amount is ejected through the nozzle as the ladle is tilted up and down. This provides a very effective means for separating the fully desulfurized metal from the desulfurizing slag, and it also provides a means for retaining the molten desulfurizer in the hooded ladle where it can be reused for additional desulfurizing. If maximum desulfurizing is to be accomplished, excessive accumulations of pre-used molten sodium hydroxide should not be maintained in the hooded type ladle because increasing amounts of sodium sulfide in the desulfurizer will lower the degree of desulfurization of the metal.

The cost of desulfurizing iron by this method is, of course, dependent upon the amount of sulfur that must be removed. This in turn is dependent upon the sulfur content in the original metal and the level of sulfur after desulfurizing. At present prices metal containing about 0.10 pct sulfur can be desulfurized to 0.010 pct or less at a cost of about $0.80 per ton. If the original sulfur is about 0.15 pct, the cost will rise to about $1.00 per ton. With initial sulfur reasonably low, such as blast furnace metal, and a need to desulfurize down to only a level of about 0.025 to 0.035 pct, the job should be accomplished at about $0.45 or less per ton.

When and How To Use

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Detroit

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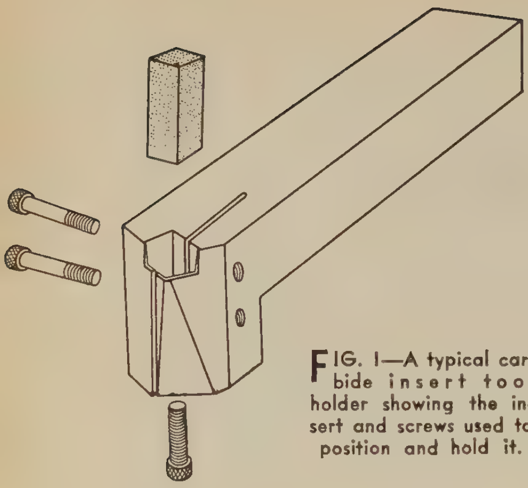


FIG. 1—A typical carbide insert tool holder showing the insert and screws used to position and hold it.

THE increased use in machining applications of insert type tooling in the effort to raise production and reduce machining costs has led to a need for a better understanding of how to get the most out of carbide insert type tools. These tools have several major inherent advantages, including reduced time for maintaining tools, simplified grinding, more production per grind, and semi-permanent holders.

A dull insert can be indexed to a new cutting edge or removed and sharpened without disturbing the holder or the machine setup. Inserts are quickly resharpened by off-hand grinding since relief angles are a function of

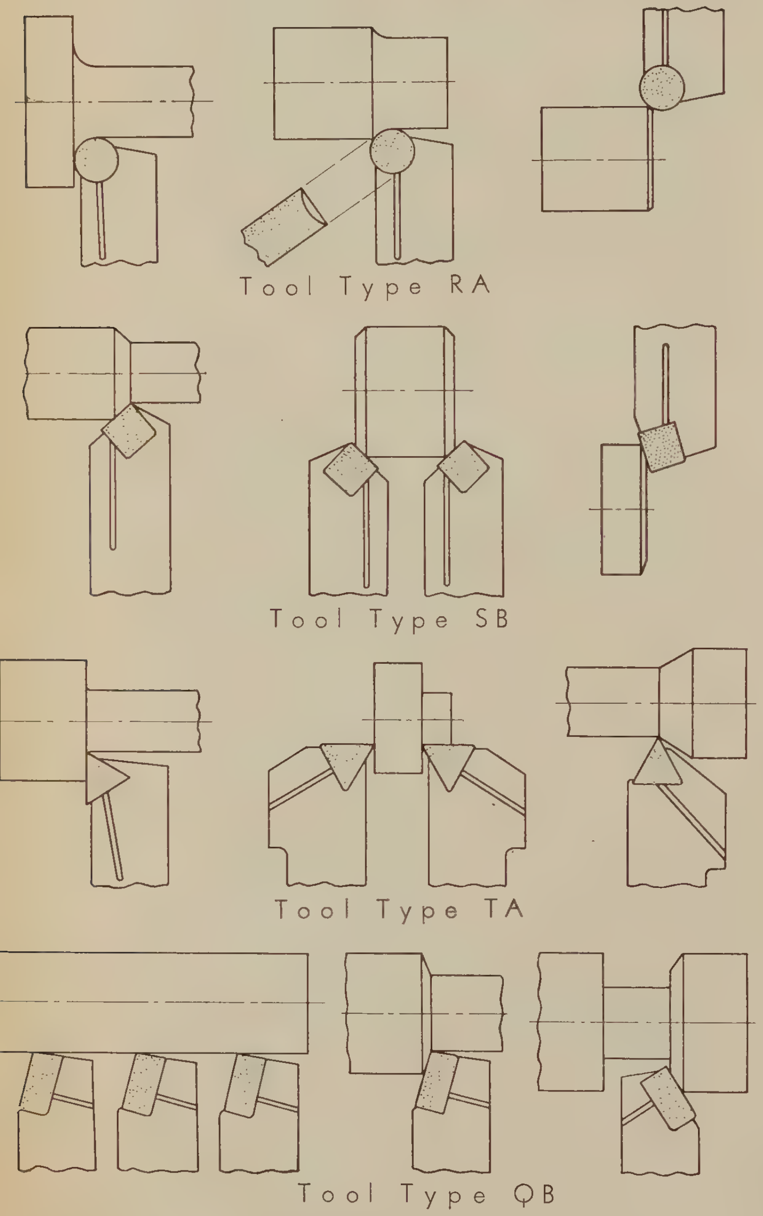

Tool Type RA
Tool Type SB
Tool Type TA
Tool Type QB

FIG. 2—Standard insert tool holders and a typical application for which each is suited.

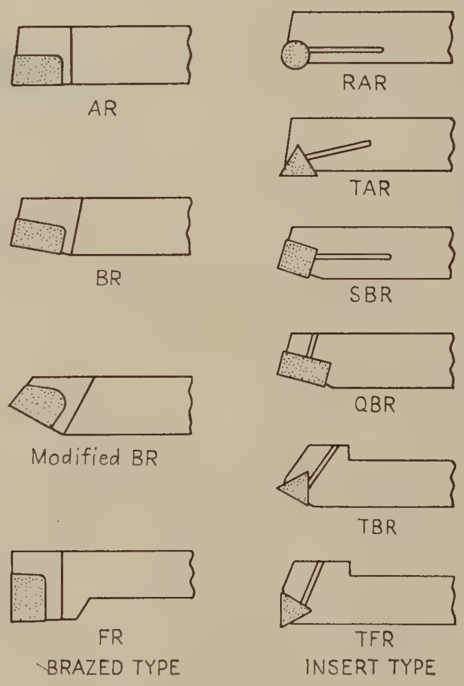

AR
RAR
TAR
BR
SBR
QBR
Modified BR
TBR
FR
BRAZED TYPE
TFR
INSERT TYPE

FIG. 3—The similarity of insert tool styles to brazed tool styles is shown here.

Carbide Insert Cutting Tools

Full advantage of the use of carbide insert cutting tools can be realized only with a complete understanding of the characteristics of this new type tool. This article tells the cutting tool user how tools and toolholders should be designed, applied and maintained, with particular emphasis on the holder design and the grinding of the inserts.

the tool holders. Inserted tools have several cutting edges, the exact number depending upon the shape of the insert. For example, a ½-in. square insert has eight cutting edges, four on either end. While holders are initially more expensive than those for conventional brazed tip tools, they are semi-perishable and with proper care will last many months on a job.

Insert tooling is not a cure-all to tooling troubles. They should not be applied indiscriminately, but, like any other type of cutting tool, will give best results when properly applied.

A tool holder for carbide inserts consists of a partially split shank having a broached cavity or recess to receive the particular shape of insert to be used. The tool holder in fig. 1, for a square insert, is typical. Clamping screws placed perpendicular to the split, hold the insert in position. A backup screw in the bottom of the holder allows for adjustment of the insert to proper height as the insert becomes shorter from continued sharpening.

Screw sizes vary somewhat between styles and sizes of tools because of space limitations and strength requirements. However, such variations have been kept to a minimum in the currently available standard holders. In all cases, standard holders have been designed that require only one size socket wrench for both the clamping and adjusting screws in any one type of holder.

For other articles dealing with insert type tooling, see: "Tool Standardization Program at GM," THE IRON AGE, *Mar.* 11, 1948, *p.* 131; *"Carbide Inserts for Single Point Tools,"* THE IRON AGE, *Apr.* 15, 1948, *p.* 82; *and "Machining Axles at Ford,"* THE IRON AGE, Apr. 28, 1949, *p.* 72.

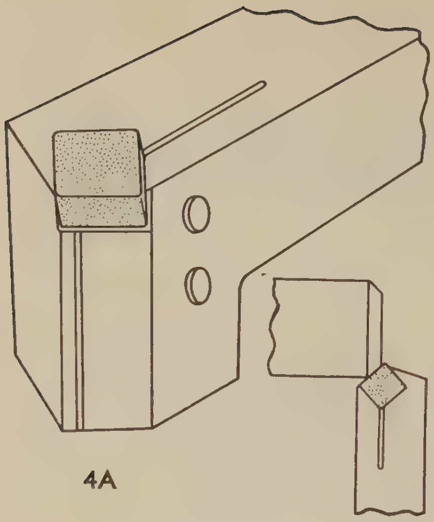
The body of the tool holder is heat treated to obtain optimum balance between toughness and hardness, inasmuch as a soft holder will wear whereas an extremely hard holder is susceptible to cracking. All holders wear after prolonged usage, so that they should be regarded as semi-perishable items.

Carboloy, Inc., has developed six standard holder types, which are shown in fig. 2 with examples of their use. These standards, together with the advantages of each type, are shown in table I. In applying standard insert holders, it is well to remember that each style is comparable with a standard brazed tool style, as shown in fig. 3, and, unless there are space limitations that will not receive the

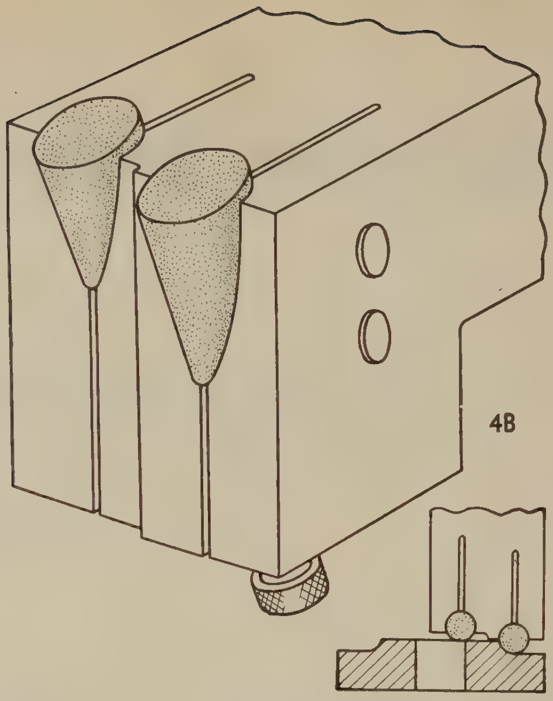
TABLE I

Standard Holders for Insert Type Tools

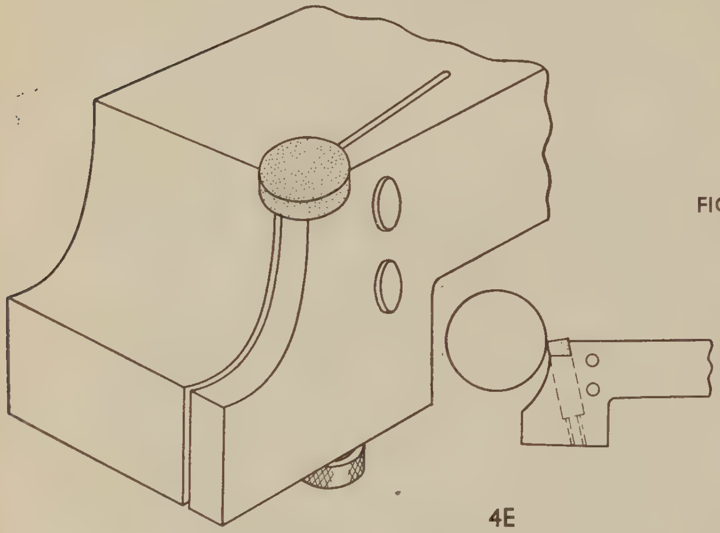
Standard Designation	Type of Insert	Remarks
RA	Round	1. Greatest strength for rough or interrupted cuts. 2. Most indexes per end on shallow cuts. 3. Lends itself to ***dish*** grinding where positive cutting rakes are desirable.
TA	Triangular	1. Only style suited to turning to a square shoulder. 2. Minimum of end pressure; excellent for machining thin-walled parts and long, thin shafts.
TB	Triangular	1. For plunge turning in multiple tool setups. 2. Clamping screw located on end so inserts can be indexed without removing holder from tool block. Screws easy to reach even when tools are very close together.
TF	Triangular	1. Particularly suited for straddle facing as paired right and left hand tools. 2. For facing to a square shoulder.
SB	Square	1. Most suitable for average roughing cuts on steel because of the 15° lead angle and the strong 90° included angle point. 2. Readily adaptable to ground-in chip breakers, either parallel or angular.
QB	Rectangular	1. Basically, same utility as the square. In addition, cuts to ⅝ in. deep may be taken with this holder, using a less expensive tip than the ½ in. square or ¾ in. square. This insert is much easier to grind than ¾ in. square.



4A



4B



4E

FIG. 4—Several special tool holders, including chamfering and

greater bulk of the insert holder, brazed and insert type tools may be interchanged without further engineering.

Most of the work to date has been done with standard holders, but some highly successful applications have been made with special tool holders. In almost all cases, standard inserts have been used and the holder made up to incorporate special angles or to receive two inserts.

Examples of such special holders are shown in fig. 4. Fig. 4A is a special type tool holder for chamfering, using a square insert positioned at 45° to parallel of the holder. Fig. 4B is a holder used for step turning or where one insert may act as a roughing tool and the second as a finisher. In designing holders for two inserts, care must be exercised in the location of the clamping screws. For example, in some cases it may be necessary to have separate screws for each inserts, since in using the regular method there is a possibility that one insert would be clamped tightly and the other remain loose.

TABLE II

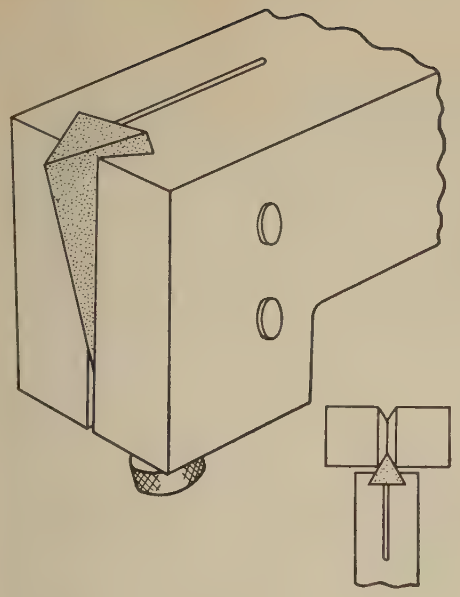
Recommended Carbide Grades for Insert Type Tools

Type of Insert	Insert Size, In.	Recommended Grade For: Steel	Other Material
Round	0.375 0.500	78 and 78B 78B	883 883
Square	0.375 0.500	78 and 78B 78B	883 883
Rectangular	0.375 x 0.750	78B	44A
Triangular	0.250 0.375 0.500	78 and 78B 78 and 78B 78B	883 883 883

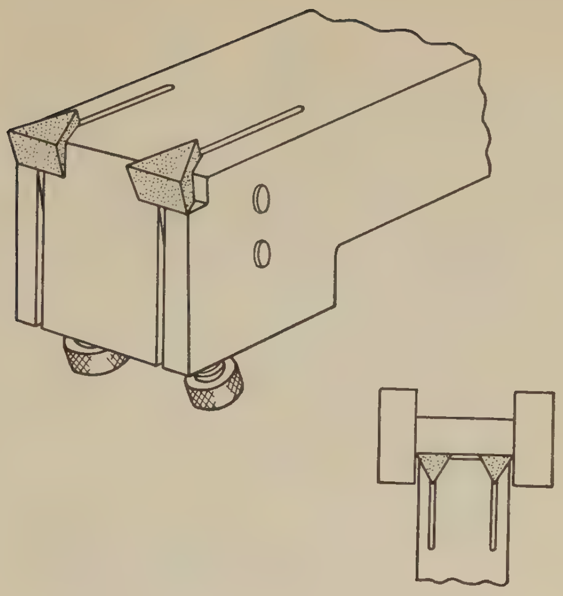
As with brazed tools, many variations from standard are possible when special holders are used. Additional examples of special holders are shown in fig. 4C, D and E. Before any proposed special holder is selected for a given application, it should be carefully laid out to insure that there is enough steel around the insert to give good clamping and ample strength. If space limitations make it necessary to weaken the holder substantially, it may prove more economical to use conventional brazed tools. The relatively high cost of special holders will usually be justified only for long run jobs, and standard inserts and holders should be used wherever possible since they are cheaper and immediately available from stock.

A number of factors must be taken into account before the type of holder best suited to the job at hand can be determined. In some cases, for example, it is difficult to place insert tool holders in tool blocks and still keep the clamping screw where it can be easily reached. Holder styles TB, TF or QB in fig. 3 may be used to advantage in such cases because these holders have clamping screws on the front rather than the side of the tool.

Peculiarities of specific machine tools are sometimes responsible for difficulties. On some



4C



4D

double insert holders, and the applications for which they were designed.

automatic lathes, tools on the back are fed in on an arc, causing the effective rake and relief angles on insert tools to vary with the diameter of the work. With brazed tools, these cutting angles may be changed readily by grinding to suit the application. On insert tools, however, relief angles are predetermined by the holder and cannot be changed. Consequently, it is often better to use brazed tools on such applications.

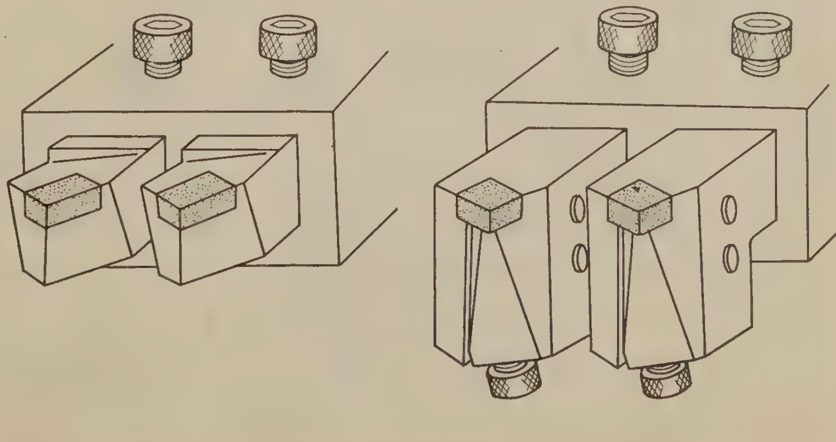
Another cutting angle difficulty is sometimes experienced when machining soft steel, aluminum, and certain non-metallics where neutral or even positive rakes are required. Except for the round inserts, which can be ground with a concave top surface to simulate a positive rake angle, it is hard to grind positive rakes into insert tools without destroying the advantages inherent in vertical carbide inserts. Before the practicability of using carbide inserts can be decided, all factors peculiar to the individual job must be considered.

While tool holders for inserts are available in shank sizes ranging from ¾ in. square to 1½ in. square, the front section of all tool holders is 2 in. high. The bottom screw that locates the insert to the centerline of the work extends beyond the front section from ¾ to 1½ in. depending upon the length of the insert. This is not objectionable on most jobs, but in some cases the front section will not clear certain parts of the machine—as when such a holder is mounted in a square turret on a lathe compound that must be indexed 360°.

The relatively heavy front section of the insert holder also poses a problem in chip space. A brazed tool is usually ground with a primary relief on the carbide and a larger secondary relief on the steel. This leaves space for chips to fall through, even when the tools are close together. On insert holders, the shank continues down at 0°, thus cutting down the chip space, as shown in fig. 5. If chips pack between the holders, the steel supporting section around the carbide insert can wear rapidly. Chip breakers that keep chips short and easily manageable is the best way to forestall this difficulty.

Some typical good insert tool setups, based on actual procedure, are shown in fig. 6. The

FIG. 5—This drawing shows the difference in chip space in multiple tool setups when using insert holders and brazed tools.



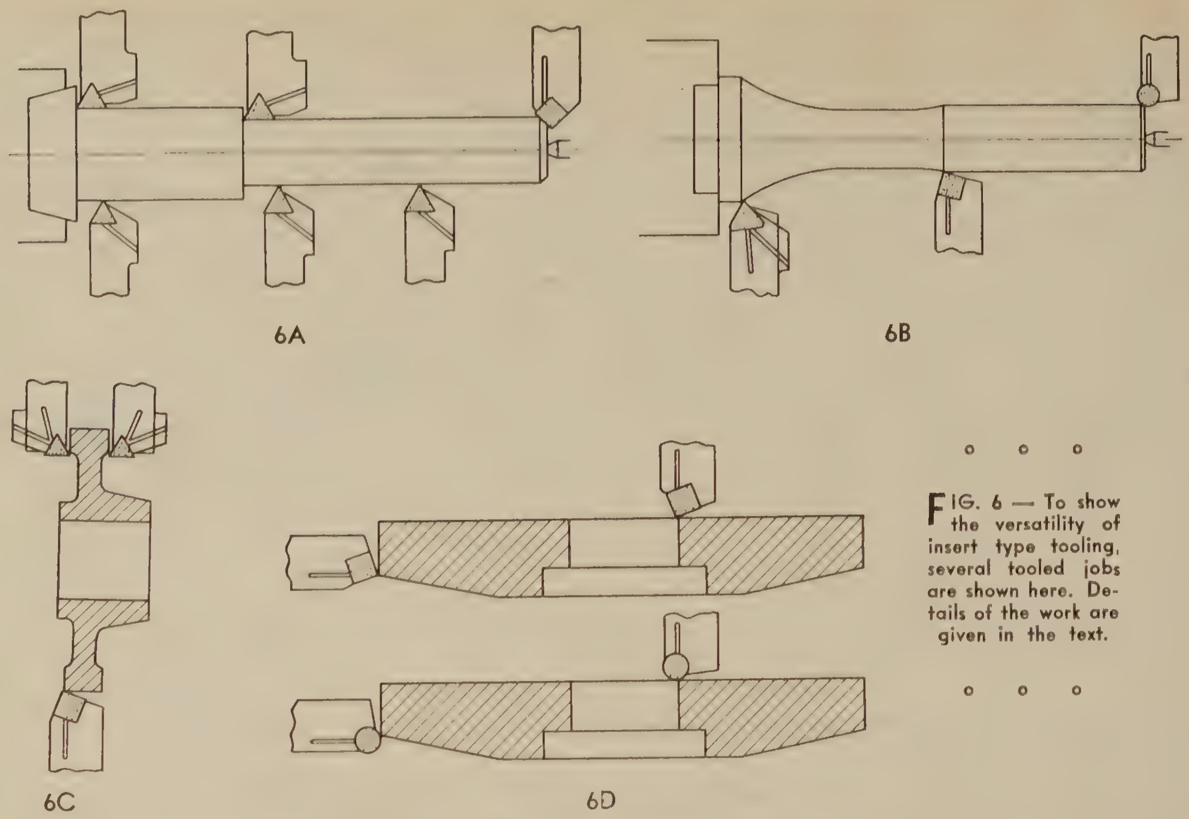


FIG. 6 — To show the versatility of insert type tooling, several tooled jobs are shown here. Details of the work are given in the text.

steel pinion forging, 420 Bhn, was rough turned and faced as shown. Cutting speed was 240 sfpm with a depth of cut of 1/8 in. and a feed of 0.025 in. per revolution. In rough turning the profile on the forged steel shaft in fig. 6B, cutting speed was 320 sfpm, with a 1/8 to 3/16 in. depth of cut and a 0.014 in. feed per revolution. Hardness of the shaft was 320 to 340 Bhn. Fig. 6C shows the tooling for straddle facing and turning a steel forging, 275 Bhn, at 340 sfpm. Depth of cut was 1/8 in. and feed was 0.019 in. per revolution. In a two operation sequence, the part in fig. 6D was rough and finish turned and faced. The work was a steel forging, 480 Bhn, and was machined at 275 sfpm. The depth of cut in roughing was 1/8 in. and in finishing was 1/32 in. Feed was 0.020 in. per revolution.

In choosing the proper carbide grade for insert type tools, the most logical grade to start with is the same grade that would be used in a brazed tool on the same job. Experience should determine whether or not it would be advantageous to go to a harder or softer grade. Grades recommended, in general, are shown in table II. These grades will handle almost any job for which insert type tools are suitable. In the smaller insert tool sizes for steel cutting, grade 78 is recommended for light cuts while 78B for the heavier cuts.

Regrinding solid carbide bits for insert type tools is neither difficult nor complicated. For resharpening without chip breaker ledges, the bits may be ground offhand on regular tool grinders. A holding fixture or a V-block may be used. The grinder table should be set for *no relief* and a protractor tool guide used to maintain squareness of the bit. For greater accuracy, the ends of the inserts may be ground flat and square on a surface grinder.

Chip breakers may be ground into insert tools as into brazed tips. Square, rectangular and triangular inserts are held in a simple fix-

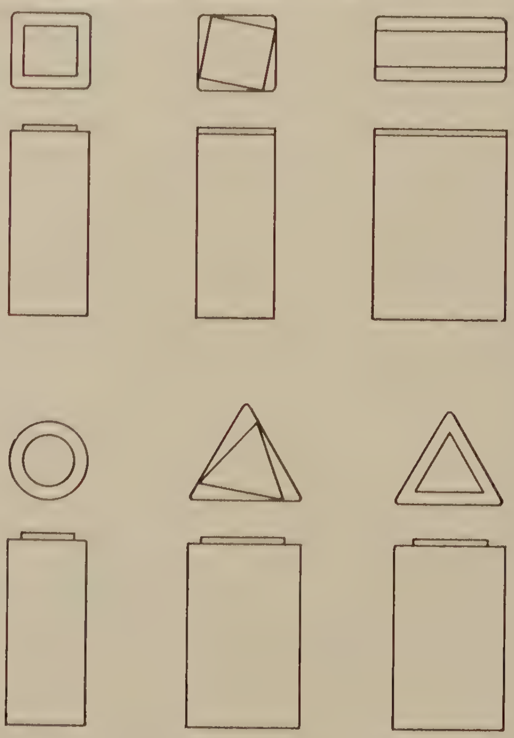


FIG. 7—Chip breaker styles for insert type tool bits.

ture, preferably one that can be indexed so that only one setting need be made. Typical chip breaker patterns for insert bits are shown in fig. 7. Once setup in a fixture, grinding can be performed on a chip breaker grinder or on a surface grinder. It is possible to leave the insert in its holder and grind as with a brazed tool.

Round inserts lend themselves to dish grinding, the insert being ground with concave end surfaces to produce neutral or positive rake angles. To do this, a thin diamond wheel is set to the centerline of the insert. The periphery of the wheel forms the concavity. A 6 in. x ⅛ in. diamond wheel forms a neutral rake on a ½ in. round insert. Positive rakes may be formed by using wheels of smaller diameter.

To dish grind or to grind a chip breaker ledge in a round insert, some type of rotating work fixture must be used. This can be accomplished by mounting a motor-driven workhead on a surface grinder or by using a universal cutter grinder or similar equipment.

Insert tool holders are subject to wear from chip impact and from the continual loosening and tightening of the clamping screws. In general, however, only reasonable care need be exercised. The following suggestions will help prevent rapid wear or destruction of holders:

(1) When machining steel, design the chip breaker to break the chip against an unturned work shoulder or on the side of the carbide insert to protect the holder as much as possible.

(2) The tool holder recess should be kept free from chips and foreign matter to avoid difficulty in properly clamping inserts. The insert recess is broached to close tolerances so that inserts fit snugly, yet may be removed and indexed easily.

(3) Threads of clamping and adjusting screws should be kept clean to guard against stripping.

(4) Do not use extensions on socket screw wrenches or otherwise exert more pressure on clamping screws than needed to hold the inserts firmly.

Thickness Tester for Tinplate Coatings

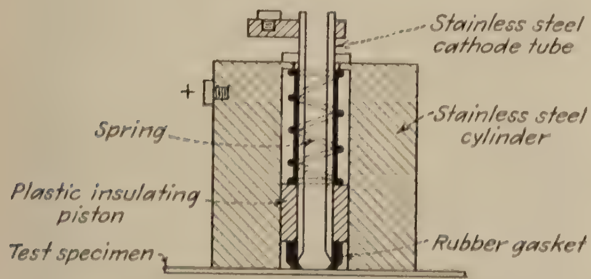
DETERMINATION of the coating thickness of hot-dip and electrolytic tinplate with the Francis thickness tester* provides a rapid and accurate technique for control and testing laboratories, according to a report, based on investigations carried out by the British Tin Research Institute, in the April issue of Sheet Metal Industries (London).

The instrument, a diagrammatic section of which is shown in fig. 1, anodically dissolves under controlled conditions a known small area of the coating so that the time required for dissolution can be used as a measure of thickness simply by reading the value from a calibration curve such as that shown in fig. 2.

A change in the stripping cell voltage, indicative of complete tin removal, automatically actuates a relay, stopping the timer which has started when the stripping circuit was first closed.

For hot-dip and flow-melted electrolytic tinplate, only the free tin will be stripped. The thin layer of tin-iron alloy on the surface of the base metal will not be touched. It is, therefore, necessary to make an additive correction when the total coating is required.

For heavy coatings, in excess of 0.0004 in. or roughly equivalent to 3.6 lb per base box, the stripping time becomes rather long and accuracy decreases slightly. Dissolution will not be 100 pct efficient if current is stepped up beyond established limits in attempting to reduce the stripping time.

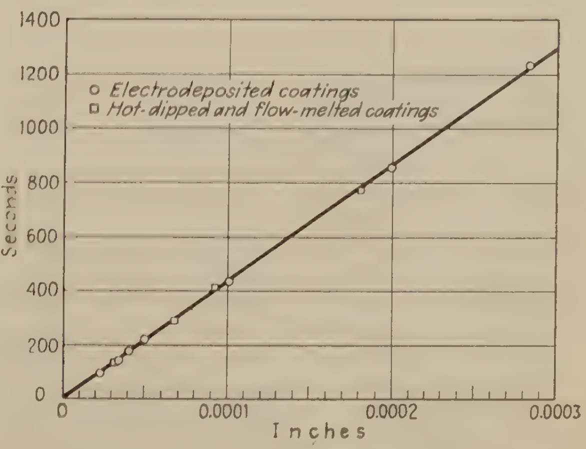


ABOVE

FIG. 1—Diagrammatic section of the stripping cell.

RIGHT

FIG. 2—Typical calibration curve showing the relation of stripping time to coating thickness.



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*Francis, H. T., "An Electrolytic Thickness Tester for Plated Metal Coatings," Trans. Electrochem. Soc., 1948, 93 (3).

Foundry Meeting

Progress reports on nodular graphite iron featured AFS convention . . . Motion pictures used extensively to study gating and feeding problems . . . Horlebein elected president

THE 53rd annual meeting of the American Foundrymen's Society, held last week at St. Louis, was marked by warm weather and warm discussions, particularly when nodular cast iron was the topic.

Some 2000 members of the society participated in 4 days of a varied and intensive technical program, climaxed by a banquet which was addressed by W. Stuart Symington, the U. S. Secretary for Air.

Aside from the intense interest in nodular graphite irons, probably one of the more significant trends noted at this meeting was the recognition being given to the society's educational program, particularly its role in the Foundry Education Foundation project. The need for encouraging young graduate engineers to enter the foundry industry is apparently being given more and more attention by high level management.

This year's Charles Edgar Hoyt lecture was delivered by John Howe Hall, consultant, Swarthmore, Pa. Mr. Hall's subject was "Steel Castings in Welded Assemblies." Mr. Hall's lecture was devoted chiefly to illustrating the point that, properly engineered, the combination of steel castings and rolled or forged steel, joined by welding, offers some outstanding advantages to both the producer and the user of such assemblies. Welding techniques, he said, are no longer an obstacle to the use of these assemblies. The lecturer showed a large number of examples of such assemblies, ranging from ship and locomotive parts to automobile components.

Certainly one of the high spots of the technical sessions was the panel discussion of nodular graphite cast iron which attracted an estimated 1000 persons to the Jefferson's Gold Room.

This attendance, easily the largest for any single meeting at the convention, illustrated the widespread interest in this development.

The discussions at this meeting emphasized that a great deal of investigative work is being conducted in many directions and new information is constantly being added to the knowledge of this new material.

The lead-off speaker at this session was D. J. Reese, International Nickel Co., who emphasized that ductile[1] iron can be produced in practically any reasonably well controlled steel, gray or malleable foundry, and that it can be produced without hazard in all types of melting equipment used in the foundry. Any of the conventional methods of heat treating ferrous metals are applicable to ductile iron.

The spheroidal form may be attained, according to Reese, irrespective of phosphorus or sulfur content; ductile iron has been produced with charges of 100 pct pig; with 100 pct scrap; with 100 pct sash weight scrap, as well as with the usual cupola charges.

Reese re-emphasized that ductile iron is not sensitive to section size, and that the machinability of ductile iron is better than malleable or cast iron at equivalent levels of physical properties. Inco is now making an extensive study of the mechanical wear resistance of this new iron and observations to date are that ductile iron is at least as good as flake graphite cast iron in this respect. Growth tests, Reese reported, indicate that ductile iron grows less than flake graphite iron or Ni-Cr alloy flake graphite iron.

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[1] *Editor's Note: The general trend at this panel discussion was to use the expressions "nodular carbon" and "spheroidal carbon" interchangeably to describe the graphite form resulting from magnesium treatment. However, engineers of International Nickel Co. have consistently used the expression "spheroidal carbon," which they state is not synonymous with nodular, and is a more accurate description of the carbon form found in the treated metal. Reese, in his discussion, made the specific point that attainable engineering properties of spherical iron are greater than for nodular irons. "Ductile iron" is a description applied by Inco to nickel-magnesium treated iron (see "Ductile Cast Iron—A New Engineering Material,"* THE IRON AGE, *Feb. 17, 1949, p. 76.)*

[2] *See "Producing Nodular Graphite with Magnesium," American Foundryman, February 1949, p. 30; see also "Magnesium Treatment for Nodular Graphite Cast Iron,"* THE IRON AGE, *Feb. 24, 1949, p. 97.*

The largest tonnage of ductile iron produced in one day in one foundry, Reese reported, is 50 tons. The largest number of heats in any commercial foundry to date is 50.

Reese thought that while ductile iron might prove to be a bit of a headache right now for the malleable industry, in the long run it will be found beneficial. Malleable foundries, he said, can and are using this development.

None of the applications of ductile iron thus far established have replaced cast iron, Reese said; applications have in all cases thus far replaced materials produced by other industries.

Touching on costs in a general way, the speaker said that techniques now in use permit production of spheroidal iron at $5 per ton of hot metal, not considering raw material costs.

One of the exhibits of ductile iron shown by Reese was an 8-in. cast pipe with an 0.42 in. wall. This part, cast in ductile iron, had a strength approaching 50,000 psi, as compared with acceptance tests of 18,000 psi for a cast iron part.

The second speaker on the panel was C. K. Donoho, American Cast Iron Pipe Co., who supplemented data previously published by him[2], and described a production cast of magnesium treated iron in 1000-lb ladles using 70 pct Cu—30 pct Mg as the addition alloy. Consistent results were obtained from ladle to ladle and it was found that the iron could be held up to 15 min without loss of effect. And by using a high carbon base iron, no trouble with shrinkage or fluidity was encountered.

G. A. Vennerholm, Ford Motor Co., reported that Ford had run more than 100 heats of treated iron using various additions. He thought the nodular irons hold considerable promise for many applications, but would not necessarily make obsolete existing types of iron. There are no serious problems involved in the production of nodular iron, he said.

Vennerholm said he didn't quite agree with the describing of the treated iron as "ductile" iron, particularly when considering the ascast properties. This speaker stressed the desirability of a low sulfur base iron.

In an effort to overcome this sulfur question, Vennerholm reported using basic iron, with additions of 28 lb of 50-50 Mg-Cu per ton of cupola iron. He also touched on costs of producing treated iron by various melting methods.

Vennerholm said that the modulus of elasticity of the nodular iron was particularly valuable. He also emphasized the need of more evaluation of physical properties.

E. W. Horlebein

W. L. Woody

New AFS Officers

• • New officers of the AFS for 1949-50 unanimously elected at the 53rd general meeting are: President, E. W. Horlebein, president, Gibson & Kirk Co., Baltimore; and vice-president, W. L. Woody, vice-president of operations, National Malleable & Steel Castings Co., Cleveland. New directors elected are: T. E. Eagan, chief metallurgist, Cooper-Bessemer Corp., Grove City, Pa.; L. C. Farquhar, works manager, American Steel Foundries, East St. Louis, Ill.; F. G. Sefing, research metallurgist, International Nickel Co., New York; L. D. Wright, superintendent, U. S. Radiator Co., Geneva, N. Y., and V. J. Sedlon, president, Master Pattern Co., Cleveland. W. B. Wallis, retiring AFS president, will also serve as a director. The new executives will take office in July.

R. G. McElwee, Vanadium Corp. of America, spoke a brief word of caution to foundries planning to experiment with magnesium treatment, stressing the need of some degree of control of melting operations.

Max Kuniansky, Lynchburg Foundry Co., reported that his company was very happy about experience to date with magnesium treatment on a production scale. Summing up the salient factors to be watched in producing this iron, Kuniansky put it thusly: "the lower the sulfur, the lower the phosphorus, the higher the total carbon—the better."

C. O. Burgess, Technical Director of the Gray Iron Founders Society also stressed the need for control in producing magnesium treated iron. The value of laboratory study of structures and other factors might result in the development of a central clearing house, he said.

A representative of Union Carbide and Chemical Research laboratories thought that additions based on zirconium alloys might prove useful for increasing the time treated metal might be used without loss of effect of the nodulizing agents.

J. T. MacKenzie, American Cast Iron Pipe Co., expressed the belief that nodular iron wouldn't replace very much gray iron; the lack of damping capacity for sliding friction, he said, was a disadvantage of the magnesium treated iron. Dr. MacKenzie also touched on the patent situation, and noted that Acipco has also filed some applications on magnesium-treated irons.

There was some additional discussion from the floor which, in addition to the main papers, will shortly be published in AFS Transactions.

The use of the motion picture camera, with its ability to slow down action, as a research tool for studying casting feeding and gating problems was well demonstrated by three films shown at the convention.

One film was made as a research project of the AFS Aluminum and Magnesium Div., and was shown in connection with the paper "A Study of the Principles of Gating," prepared by R. E. Swift, J. H. Jackson and L. W. Eastwood, all of Battelle Memorial Institute. In this work the authors made use of transparent lucite molds of various designs, into which water was poured under varying conditions and photographed with high-speed cameras. Small holes were drilled in the mold at suitable locations to simulate vents and permit a study of aspiration of air into the liquid stream. Where conditions favorable to aspiration existed, air bubbles would develop and would be enveloped by the water in a manner at least analogous with molten aluminum.

• The 1949 Charles Edgar Hoyt Annual Lecture was delivered by John Howe Hall, foundry consultant, Swarthmore, Pa. Mr. Hall discussed "Steel Castings in Welded Assemblies."

While acknowledging certain deficiencies in the use of water as a substitute for aluminum, the authors felt that the behavior of the two liquids was similar enough to permit the development of information applicable to aluminum. In the course of the study several pours of Wood's metal were made which indicated that the rate of flow in unit volumes per second was nearly the same as that of water. The escape of air bubbles from the surface also showed that this liquid metal entrained air in a manner quite similar to water.

This present study was limited to gating applicable to castings having substantial lateral dimensions but relatively small vertical height; gating for other types of castings will be covered by later studies. In the report the authors discussed the design and dimension features of runner boxes, gates and sprues which appeared to give the best pouring results.

Two additional films, in color, were shown in connection with study of finger gating and step gating reported by W. H. Johnson and W. O. Baker, Naval Research Laboratory, Washington. These films—one devoted to step gating techniques, the other to finger gating—supplemented work described by the same authors at the 1948 convention. The present work, which was done with molten steel at 3000°F, demonstrated forcibly and clearly, the effect of various arrangements of sprue and fingers on both turbulence of the metal entering the mold and the sequence and rate of the feeding of the various fingers and steps. In the study of step gating the authors illustrated the development of a gate design which produced, through three steps, very nearly true sequence flow and which allowed the metal to enter the mold very quietly.

The perennial discussion of the causes and effects of gases in cast metals, particularly in copper base alloys, was again the subject for extensive debate. A formal discussion of this subject was contained in the paper "Metal Melting in Its Relation to Gases in Metal," by O. E. Decker, foundry superintendent, Acheson Mfg. Co., Pittsburgh. The author presented practical suggestions for melting brasses and bronzes to produce sound castings, covering melting furnace design, size of crucible in relation to furnace, proper control and furnace maintenance. Among the interesting points covered by the author was the use of fluxes. He said that his experience has been that one teaspoon of 15 pct phosphor-copper shot will successfully flux 150 lb of red brass. This flux is placed in a small paper bag and the furnacemen are given enough bags for a day's heats. It has been found, he said, that when the furnacemen are allowed free use of the flux they not only use too much in the deoxidizing process but also use it during the melting period. They claim it melts down their charge quicker, but this is a fallacy for the charge may look liquid but it takes real heat to raise the temperature enough to pour without misruns or cold shuts. The author said he believes that too much phosphor-copper will harm the metal and cause leaky castings.

Another paper of interest on copper base alloys was the discussion entitled "Gas-Fired Melting of Copper-Base Alloys in a Reducing Atmosphere." presented by D. C. Caudron, foundry superintendent, Pacific Brass Foundry, San Francisco. The paper described essentially, a method developed in the period 1937-42 for melting under a reducing atmosphere using natural gas and subsequently blowing compressed air through the melt before pouring. Some of the advantages of this method listed by the author are: It is not necessary to control accurately and periodically check the combustion mixture; it eliminates slag buildup in open flame burners and consequently there is minimum contamination when heat of incompatible alloys follow each other; it reduces metal loss since there is no oxidation, and metal remains in the furnace or slag; and it establishes

AFS Gold Medal Winners

R. J. Anderson

S. C. Massari

Gosta Vennerholm

AFS Gold Medal Winners

• • **The Peter L. Simpson medal was awarded to Russell J. Anderson, works manager, Belle City Malleable Iron Co., Racine, Wis., for outstanding service to the society and in the public interest as chairman of the Wisconsin Chapter and of the Wisconsin Centennial Foundry Committee.**

The John H. Whiting gold medal was awarded to S. C. Massari, technical director of AFS, for outstanding contributions in the field of ferrous metallurgy, molding and foundry practice and service to the wartime foundry industry with the Chicago Ordnance District.

The William H. McFadden gold medal was awarded to Gosta Vennerholm, supervisor of metallurgical research, Ford Motor Co., for outstanding contributions to the casting industry in the field of ferrous metallurgy and practice.

a definite end point or condition of the metal. The blowing operation is performed when the heat has reached the required temperature. The time required for this operation may be anywhere from 15 to 90 sec., depending on various factors. No metal loss of any significance was reported resulting from the blowing operation.

The sand casting committee of the Aluminum and Magnesium Div. presented a report on "Fluxing of Aluminum Alloys" which covered the removal of oxides, degassing, the materials used for this operation and precautions necessary when carrying out these operations.

A paper, entitled "A Study of Insulating and Mildly Exothermic Anti-Piping Compounds Used for Steel Castings," was presented by S. L. Gertsman, physical metallurgist, Bureau of Mines, Ottawa. In the study a standard casting was designed and a series of tests were made using this standard on seven types of anti-piping compounds. The author reported on the thermal characteristics produced in the riser metal, the minimum size of riser that can be used for the standard casting with each compound, the type of shrinkage cavity produced in the riser, and the length of time required for the top of the head to freeze. It was found that the temperature gradient in the castings is reduced considerably by the use of these compounds. It would appear that the method outlined in this paper could be used by foundrymen as a standard to evaluate the efficiency of any new compounds of this type. Among the conclusions drawn by the author were: (1) Complete directional solidification from the casting toward the top of the riser was not achieved in any of the tests; (2) care must be taken that sufficient material is used, for if not enough compound is added to the riser, the results may be as poor as if no compound were employed, and (3) for five of the seven materials tested, doubling the quantity of compound used produced no improvement in the results obtained.

A report entitled "Recent Developments in the Theory and Practice of Insulating Sleeves, Pads and Risers for Nonferrous Castings," delivered by K. A. Miericke, U. S. Gypsum Co., noted that the insulative value of riser sleeves and pads made of a permeable gypsum cement composition are equal to those made of regular metal casting plaster.

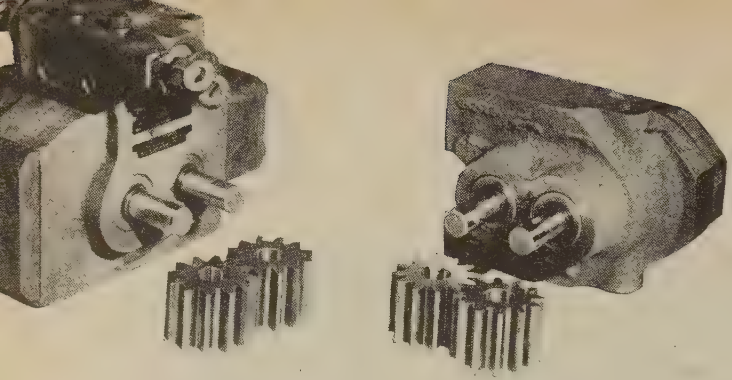


FIG. 1—Two of the hydraulic pumps produced at the Wayne, Mich., plant of Gar Wood Industries, Inc.

Cutting Hydraulic

HYDRAULIC pump gears present a number of manufacturing problems not encountered in producing conventional gearing. Pump gears are usually of coarser pitch than customary for the relatively smaller diameters used. This results in less involute overlap, making it more difficult to hold accurate tooth spacing with conventional methods of gear generating. Accuracy of spacing, tooth form and all other dimensions, including face widths, are essential to insure maximum hydraulic efficiency after assembly. Frequently there is little stock between the root of the teeth and the bore of the gear, making it difficult to hold and drive the gear during the cutting process. The coarse pitch gears for high capacity pumps require exceptionally heavy stock removal, particularly since faces are generally quite wide as compared with the gear diameter. There is necessarily little clearance between the tip of a tooth and the root of the mating tooth.

Gar Wood Industries, Inc., Wayne, Mich., has recently developed a gear cutting process for such gears that not only takes care of the major problems but also greatly reduces the time required to cut individual pump gears. On one gear, the production time was reduced from 18 min to 93 sec. These gears, assembled in pairs, are used to produce a line of seven pumps, ranging in rated capacity from 13½ to 52 gpm at 1000 rpm and 800 psi. The pumps are used to operate various hydraulic devices manufactured by Gar Wood at their Wayne, Mich.; St. Paul, Minn.; Findlay, Ohio; and Richmond, Calif. divisions.

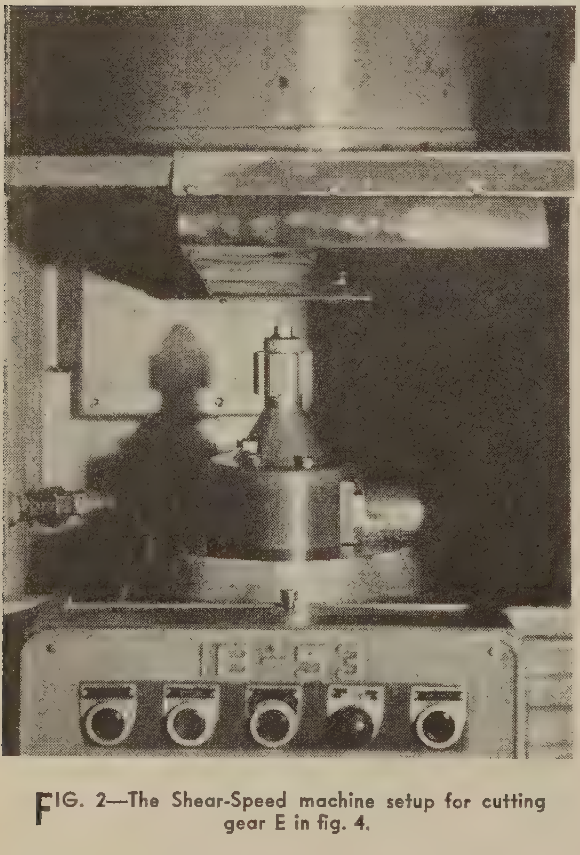


FIG. 2—The Shear-Speed machine setup for cutting gear E in fig. 4.

The basis of the process is the *Shear-Speed* gear cutting machine, produced by Michigan Tool Co., Detroit, which employs form tools rather than generating tools and cuts all teeth of the pump gear simultaneously.

The cutting tools are fed into the blank radially, an arrangement that has several advantages. Lack of involute overlap becomes unimportant, since spacing is controlled by the accuracy of the tool head in the machine and the gears do not rotate during cutting. Cutting pressures are radial and balanced on all sides, so that there is no tendency for the gear to distort, regardless of how light the section might be at the base of the tooth. Simultaneous cutting of all teeth reduces cutting time. Accuracy of tooth form is easily controlled, since this depends almost entirely on the accuracy of the form ground into the tools. Output per grind of tools is high, thus requiring fewer shutdowns for tool resetting during a production run, and the design of the tools allows for 43 sharpenings, removing 0.015 in. each time.

As the result of the high productivity obtained, Gar Wood has found that it can produce the necessary quantities of its five major gear types on a single Shear-Speed machine, using interchangeable tool heads when shifting from the cutting of one gear type to another. Production requirements vary considerably for the different gears, but the setup lends itself well to job lot runs.

Following cutting, the gears are finished to final tolerances on Michigan Tool gear shavers installed adjacent to the Shear-Speed. There are three shavers used.

Fig. 1 shows the two most popular pumps produced at the Wayne plant. At the left is the Gar Wood model 1500 series pump and at the right is the St. Paul model 1500 series type. Both

Pump Gears

pumps use the same type gears, these being 2.332 in. diam, 12 tooth gears with a 1⅝ in. face. The gear material is SAE 8620 steel.

The Shear-Speed machine setup for cutting the model 1500 gear is shown in fig. 2 with the tools in the head above the work. Fig. 3 shows the cutting head, together with a finished gear and a gear blank. The head is automatically lowered to a point just over the work before the start of the cut and is locked in place. The tools feed in radially a small amount each time the work is reciprocated, up and down, through the head. This continues until full tooth depth has been reached. During the return stroke, the tools retract slightly to prevent drag on the tools.

The five types of pump gears produced are shown in fig. 4. The model 1500 series gear is shown as *E*, together with one of the Shear-Speed form tools used to cut the gear.

The method used in cutting gears *A* and *D* is unusual. These gears have 12 and 10 teeth, respectively, but the teeth are deep because of the coarse pitch required and the wide faces employed, 2¾ and 3¼ in., respectively. The amount of stock that must be removed from the blank is quite considerable. For gear *D*, for instance, it is almost half of the original weight of the blank.

To cut such gears, Gar Wood Industries uses two operations on the Shear-Speed, as shown by the two types of tools alongside gear *A*. Part of the depth is cut with one tool and the remainder with a second. Only one tool-head is required for the two operations, since the tools are interchangeable in the head. Gear *A* is used in road machinery and gear *D* in the Gar Wood *Loadpacker.*

Gear *C* is also cut in two steps, but in this case two finished gears are produced at one time by stacking two blanks on the arbor, one above the other, for both roughing and finishing operations.

Gear *B* although having a 2¾ in. face width, is cut in one step because its pitch is finer, making the tooth depth smaller.

In ordering tools for cutting these pump gears, Gar Wood buys one or two tools more than required according to the number of teeth. It keeps these in reserve in case of accidental damage to a tool. When reordering a set of tools, the spares are returned to the manufacturer, and the exact number required, duplicating the spare are ordered. Thus there is always available one extra master tool for each gear type. To date, however, no breakage has been encountered.

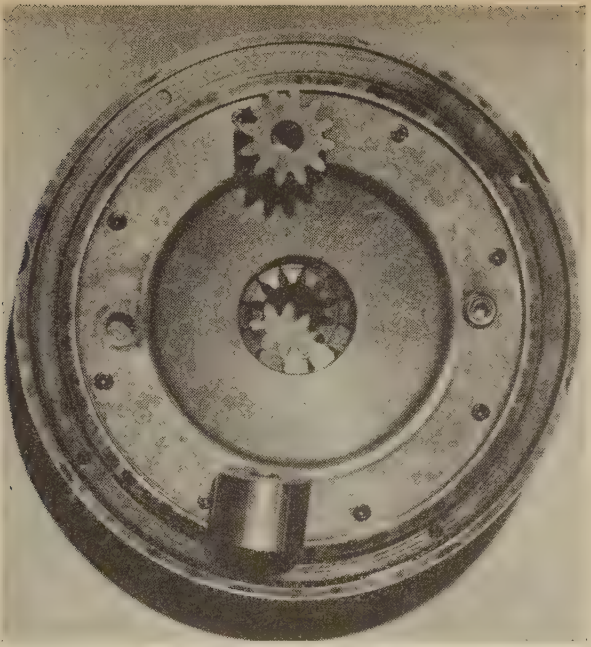
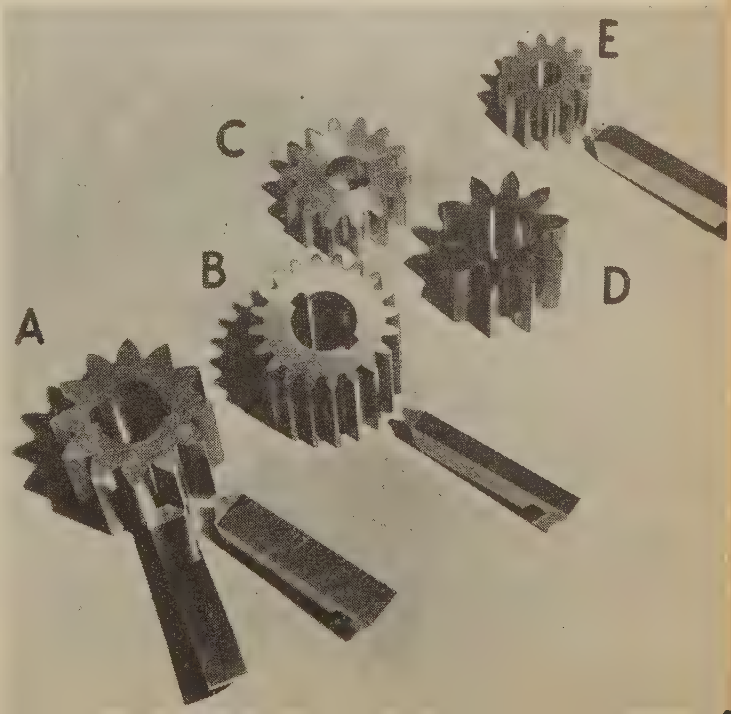


FIG. 3—The cutting head, a finished gear and a gear blank are shown here.

Should a tool be broken, incidentally, cost of replacement would be relatively small, since only a single point tool is involved.

About 0.003 to 0.004 in., as measured over pins, is allowed on the gear diameter as it comes off the Shear-Speed. This is removed in the final finishing operation on the Michigan gear finishers. An interesting fact is that it actually takes less time to cut the gears than to finish them, the reverse of conditions with customary gear production methods. *Underpass* finishing, which would greatly reduce finishing time, would require fairly wide cutters in view of the face widths of the gears. However, the major reason is the extremely short cycle for cutting the gears.

FIG. 4—The five types of pump gears cut are shown here, along with single point tools used for cutting typical gears.



Intermittent Oxygen Enrichment of the Cupola Blast

A practical demonstration of the value of intermittent oxygen enrichment of the cupola blast as a method for maintaining optimum temperature and melting rates is given in this report of the experience of a gray iron shop, producing thin-section castings, with 4 pct enrichment for 2 to 4 min periods. Effect of the addition on the lining and cost of the oxygen are discussed.

° ° °

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and

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° ° °

INTERMITTENT use of oxygen enrichment of the gray iron cupola blast can be a most useful tool to the foundryman, under certain conditions. This article describes the use of oxygen in two cupolas of a mechanized foundry with which the authors were previously associated. The experience with these cupolas is now being applied to a foundry of more versatile nature.

At the time of this writing, the foundry previously referred to had utilized oxygen enriched air blast in the operation of two cupolas for a period of 5 months. These cupolas are used for the continuous melting of soft gray irons for light weight castings such as lawn mower wheels.

In the use of oxygen in the cupola blast, the results obtained in the first experiments and in the later day to day production applications have borne out the experience of other investigators—that there is always an increase in the temperature of the metal melted and that the melting rate is increased when oxygen is added to the cupola blast.

Reports from other investigators indicate that a 3 to 10 pct increase in the oxygen content of the cupola blast is necessary in order to obtain a useful temperature and melting rate increase. It would be exceedingly impractical costwise, in most cases, to operate a cupola with a continuous oxygen enrichment of the blast. For example, considering a 36-in. cupola, it costs approximately $100 to $150 per hr to obtain a 4 to 6 pct increase in blast oxygen content using bottled oxygen. But if the oxygen additions are made intermittently for trouble shooting purposes the

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**The authors were previously associated with the Harrison-Corry Co., Knoxville, Tenn., as president and metallurgist, respectively.—Ed.*

same benefits of temperature and melting rate increase can be obtained temporarily. Used in this manner, oxygen additions to the cupola blast have been of particular value to this foundry due to the nature of the production. It is these benefits that the authors will discuss.

This foundry is a mechanized jobbing foundry producing mainly thin sectioned gray iron castings. These castings require a fairly smooth surface which in turn requires a fine, tight, low permeability molding sand. The iron to pour these castings must be relatively hot to run the thin sections in this sand. Some castings have sections as thin as 1/16 in. and the AFA permeability of the sand is 10 to 20. This requires temperatures of 2680° to 2750° F for the iron as it enters the mold to avoid losses due to misruns and other cold iron troubles.

The foundry operates continuously during an 8-hr period. The molders produce molds on jolt-squeeze type machines and place them on individual, roller type conveyers. The storage space on these conveyers is limited and will accommodate only the molds equivalent to approximately 20 min of molding. Iron is brought by pourers from one of two continuous melting cupolas on a closed pouring loop and the molds are poured on each conveyer.

The problem facing the melting department is to melt 30 to 50 tons of soft gray iron per 8-hr day at the proper temperature and rate and of a uniform temperature and composition. When the cupola is first started it must be producing uniformly hot iron within 20 min at the most after the molders have started molding in order to avoid production downtime on the part of the molders. During the 8-hr molding period the cupola can never lag behind any one molder more than this 20 min period without incurring downtime for the molder again. The cupola cannot speed up excessively in melting or there will be heavy pigging of the melted iron. If the metal becomes temporarily cold during the heat it must regain the proper temperature within this 20-min maximum to avoid downtime since a casting is never poured if the iron becomes too cold to pour that particular casting. As a rule, even less time than this 20-min maximum is permissible since the molders usually have some unpoured molds on the conveyers.

The problem of having metal of the right temperature at the right place at the right time is the fundamental melting and pouring problem in any mechanized foundry. The severity of the problem for the individual foundry depends on the foundry's metal temperature and time limit requirements. The previously mentioned requirement of 2680° to 2750° F temperature for metal as it enters the mold requires that metal being tapped from the cupola have a temperature of 2780° to 2830° F.

The two cupolas at this plant are a No. 3½ and a No. 4 Whiting unit. The No. 3½ cupola has been operated for about 2 months and the No. 4 cupola about 3 months during the 5-month period that oxygen has been used as a trouble shooting tool. Operating data applying to each cupola are given in table I.

For additional data on the use of oxygen enriched cupola blast published in THE IRON AGE, *see "Oxygen Enrichment of the Cupola Blast," April* 22, 1948, *p.* 72; *"Oxygen Enriched Cupola Blast," May* 20, 1948, *p.* 82; *and "Oxygen Enriched Cupola Blast," March* 31, 1949, *p.* 69.

Only one cupola is operated during each 8-hr heat. The cupola operator continuously checks the operation and makes changes in the air blast volume and weight of coke being charged to maintain the proper temperature and melting rate. By careful supervision, each cupola can be operated during some heats without the temperature falling below the minimum of 2780°F, or without the melting rate ever getting out of

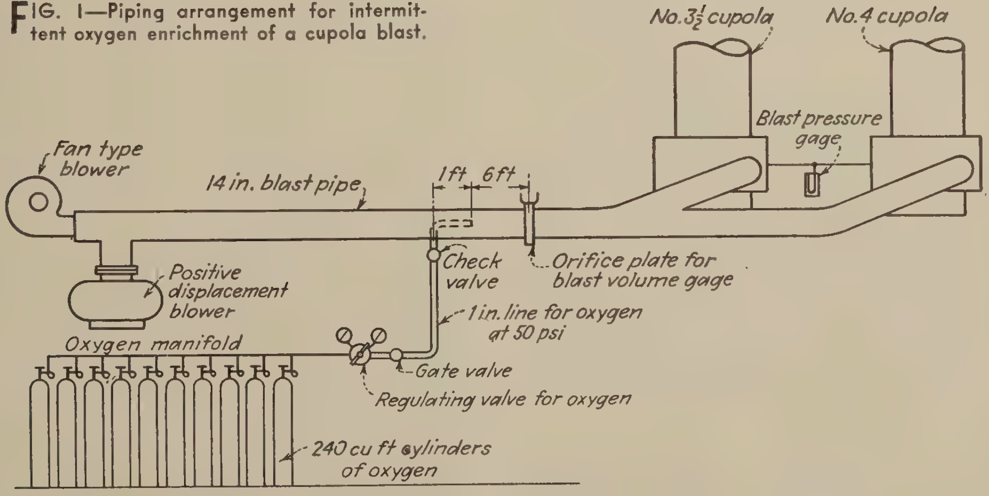

No. 3½ cupola
No. 4 cupola
Blast pressure gage
Fan type blower
14 in. blast pipe
1 ft
6 ft
Positive displacement blower
Check valve
Orifice plate for blast volume gage
1 in. line for oxygen at 50 psi
Oxygen manifold
Gate valve
Regulating valve for oxygen
240 cu ft cylinders of oxygen

FIG. 1—Piping arrangement for intermittent oxygen enrichment of a cupola blast.

TABLE I

Operational Details of Cupolas in Which Oxygen Enriched Blast Was Used

Diameter of lining	32 to 40 in.
Original coke bed height above tuyeres	60 in.
Volume range of cupola blast	2000 to 2800 cu ft per min (cold blast)
Blast pressure	10 to 18 oz per sq in.
Weight of iron charge	800 lb
Weight of coke charge	115 to 135 lb
Coke ratio	6.95 to 5.93
Desired temperature of iron	2780° to 2830°F (read optically)
Melting rate	3 to 5½ tons per hr
Approximate weight of iron in well of cupola with continuous tapping	400 lb
Number of tuyeres and their area in No. 3½ cupola	4 with 240 sq in. area
Number of tuyeres and their area in No. 4 cupola	6 with 540 sq in. area
Blowers	One Roots positive displacement blower and one fan type blower used alternately

balance with the rate at which the molders are producing molds.

During other heats, as many as four cold iron periods may be encountered, each causing 5 to 20 min production downtime for some of the molders. These cold iron periods are due to many causes but all arise fundamentally from either poor or improper raw materials, poor supervision, mechanical break-down requiring stopping of the cupola, or a combination of these factors. In any case some step must be taken to regain the proper melting temperature with the proper melting rate. One step which usually eliminates short cold iron periods due to minor causes (such as too heavy a piece of metal charged) is the temporary increasing of the air blast from 5 to 20 pct. But this method is not 100 pct effective.

The purpose of employing oxygen enrichment of the blast was to help eliminate these cold iron periods. A mechanical piping arrangement was set up (see fig. 1) which made it possible to obtain the necessary oxygen from a bank of the regular 240 free cu ft cylinders. Twenty of these cylinders are connected to a common manifold and the oxygen is drawn from this manifold, when needed, through a pressure reduction valve into a 1-in. pipe line which leads the oxygen to the cupola air blast line common to both cupolas. This 1-in. pipe enters the blast line at right angles and then turns so that a 1-ft portion is parallel with the blast line.

This arrangement has been used during all the experiments, on the assumption that the blending of the oxygen with the air blast is satisfactory regardless of the method of introduction. A few preliminary tests established the pressure setting necessary on the reduction valve to obtain a given enrichment of the cupola blast.

During the experiments a 4 pct enrichment was aimed at increasing the oxygen content of the blast from 21 to 25 pct. When oxygen was first used in the melting operation, the No. 3½ cupola with the 4 tuyeres of 240 sq in. area was being operated. This cupola is particularly troublesome from the standpoint of obtaining uniformly hot iron. This is due, in part, to the small tuyeres and the resulting concentrated air blast. The plan of the first experiments was to operate the No. 3½ cupola by the usual day to day methods and then add oxygen when a cold iron period was encountered, regardless of its cause. This procedure was followed and oxygen was added liberally to the cupola blast during every cold iron period for three full heats.

From these first few applications, the optimum time for each addition was determined. It was found that regardless of how low the temperature of the iron fell (as low as 2600°F), a 3 to 5 min addition of oxygen at 4 pct enrichment would return the cupola to its normal melting temperature. Experiments were continued over a month period with the main purpose of determining how little oxygen could be used during a heat and still operate without cold iron periods. The results given in Table II are typical of all the individual applications of oxygen made over a month period with the No. 3½ cupola, air being provided by the positive displacement blower.

The temperature of the iron being melted rises very rapidly, but the temperature increase depends upon how low the temperature of the iron fell before the oxygen was added. This definitely indicates that a certain increase in temperature can always be expected upon the enrichment of the blast when optimum melting and combustion conditions already exist in the cupola, and this value appears to be 40° to 50°F for 4 pct enrichment for 3 min. Larger increases in temperature can be expected when the melting conditions drift away from the optimum; the farther away, the larger the increase, although the final temperature will be lower. It appears that the main action of the oxygen addition is to return the cupola to its optimum melting and combustion condition. The cold iron periods during the month covered by this study had various causes but the effect of the oxygen addition was the same regardless of the cause, except in the case of very bad bridging, one instance of which will be discussed later.

TABLE II

Typical Results of Intermittent Use of Oxygen in a No. 3½ Cupola

Normal Operating Temperature, °F	Temperature of Cold Iron, °F	Minutes of Oxygen Added at 4 pct Enrichment	Final Temperature of Iron, °F (5 min after oxygen was started)	Temperature Increase, °F
2800	2650	3	2800	150
2800	2750	3	2830	80
2800	2780	3	2840	60
2800	2800	3	2850	50

One could immediately detect with the eye signs of an increase in the melting rate when oxygen additions were made, but no quantitative method was available for determining the exact amount of the increase. The first change that met the eye upon an addition of oxygen was the great increase in slag fluidity, the slag beginning to run very thin and in larger quantity before the iron had increased in temperature. This was most noticeable when the air blast was being supplied by the positive displacement blower. The blast pressure increased about 3 oz per sq in. when oxygen was added at 4 pct enrichment using the positive displacement blower as the blast source.

A large part of the observed increase in slag flow is undoubtedly due to this increase in blast pressure. There was an important difference in the performance of a given oxygen addition when using the fan type blower, as compared with same oxygen addition using the positive displacement blower. Making an addition while using the fan type blower resulted in only slight increases in blast pressure (about ½ oz) and the temperature increases were smaller by about 10° to 15°F. Melting rate increases and the heavy flow of thin slag were not so pronounced. This may be due to the increases in blast pressure and volume caused by the oxygen addition being reflected back to the fan type blower with a consequent decrease in its output, but with all the oxygen addition still getting to the cupola.

TABLE III

Typical Results of Intermittent Enrichment of the Blast in a No. 4 Cupola

Normal Temperature, °F	Temperature of Cold Iron, °F	Minutes of Oxygen Added at 4 pct Enrichment	Final Temperature, °F (5 min after oxygen was started)	Temperature Increase, °F
2800	2700	2	2780	80
2800	2750	2	2810	60
2800	2770	2	2810	40
2800	2800	2	2830	30

The larger No. 4 cupola has been operated for a 3-month period using oxygen enrichment. Being slightly larger and having a much larger tuyere area, it has shown much better operating characteristics than the No. 3½ cupola. In its operation, oxygen additions have been cut to 2 min with about 10°F lower temperature improvements than in the previously cited tests, or about 20° to 25°F lower when using the fan type blower. Typical results, using the fan type blower, are given in table III.

With either cupola and either blower, the final temperature resulting from the use of oxygen in the blast persisted for at least 30 min and sometimes for the duration of the heat (a maximum of 8 hr), providing that the final temperature resulting from the use of the oxygen was not above the maximum normal temperature. For example, if the iron temperature fell to 2750°F and oxygen was added in sufficient quantity to give a final temperature of 2850°F, this final temperature would gradually drop until a temperature of 2800° or 2820°F was reached, but this normal temperature would persist indefinitely.

In addition to 4 pct enrichment, other percentages of enrichment were tested. Larger additions gave slightly faster temperature increases and definitely higher final temperatures. Beneficial effects decreased with smaller enrichment percentages and hardly any effect could be observed at 2 pct enrichment. The 4 pct enrichment was standardized on since it performed satisfactorily with a minimum cost.

With respect to bridging and frozen slag formations, it was found that intermittent oxygen additions would help prevent these formations around and above the tuyeres, but it would not remove a formation to any great extent once it was found. Possibly prolonged, expensive additions of oxygen would finally melt away a frozen slag formation, but a more effective method was to be of shutting the cupola off, punching the bridge out with rods, and then using oxygen, if necessary, to get the cupola hot again in a minimum of time.

One very bad bridged condition occurred in the No. 4 cupola and oxygen was applied for a total of 20 min over the period of an hour at 4 pct enrichment. Although the iron remained passably hot, this heavy consumption of oxygen did not even begin to break the frozen slag formation which blocked off about half of the cupola. The use of oxygen lances on hard formations which could not be knocked out, to melt and burn them out has proven practical at this foundry.

The lining burnout was examined carefully after several of the first oxygen enriched heats in each cupola and no consistent increase or decrease in the burnout was observed. Due to the fact that the oxygen additions might be made for only a total of 6 to 10 min during the heat, an appreciable effect on the lining could hardly be expected.

One of the primary purposes of this foundry is to produce castings of a uniform, controlled quality on a day to day, month to month basis. Metallurgical control of the iron melted is a part of this overall uniform quality control. Thus, when oxygen was first used, the iron melted dur-

TABLE IV

Costs of Oxygen Use, on Monthly Basis

Monh	Cupola	Cost of Oxygen Used per lb of Good Castings Produced	Cost of Oxygen Used per lb of Metal Melted in the Cupola
1	No. 3½	$0.0010	$0.0005
2	No. 3½ and 4	0.0011	0.0005
3	No. 4	0.000211	0.0001
4	No. 4	0.000287	0.00015

ing the enriched blast period was compared with iron melted under ordinary conditions. This was repeated several times, both by chemical analysis and by comparing chill depths on chill test bars. No consistent or appreciable difference was found. No color change was observed in the slag during the short oxygen addition periods.

It is impossible to establish the exact value of the benefits obtained from the use of oxygen as described in this report. The benefits are fewer scrapped castings due to cold iron, more efficient plant operation due to the elimination of some production downtime, improved morale among the pourers who dislike to pour even questionably cold iron, and less pigged iron. The monthly costs for the use of oxygen are given in table IV. The cost per pound of good castings is approximately twice the cost per pound of metal melted since gates, risers and sprues account for a large portion of the metal poured in producing thin, light weight castings.

In summarizing the findings of this foundry, it should first be stated that any cupola can drift away from its optimum combustion and melting conditions due to many causes, even though it appears that the proper amounts of coke and air are still being charged. When this departure occurs, as evidenced by decreased metal temperatures, this foundry found that a 2 to 4 min oxygen enrichment of the cupola air blast at a 4 pct addition would almost invariably return the cupola to its normal melting condition and normal conditions might persist from 30 min to the full heat. This oxygen addition effected both an increase in the temperature of the metal being melted and an increase in the melting rate. Melting rate increases were not measured quantitatively.

A given amount of oxygen was found to be more effective when added in an air supply system using a positive displacement blower than when using a fan type blower. Occasional use of oxygen during a heat helps prevent bridging conditions around and above the tuyeres, but it was not found to be an economical tool in melting away these formations when it is added to the cupola air blast. Possibly in preheated blast cupolas it would be more effective for this purpose. Intermittent use of oxygen during the heat was found to have no effect on the lining of the cupola and no metallurgical effect on the iron being melted.

Straightening Shafts

STEEL forgings on which pinions are subsequently cut at the Yale & Towne Mfg. Co.'s new Philadelphia plant frequently distort slightly at the keyway during heat treatment. This necessitates straightening, which is done rapidly in a Hanafin hydraulic press. While this press, used for other work, has a maximum rated capacity of 35 tons, the maximum pressure for a given job is regulated by reducing the oil pressure applied to the ram. This can be controlled so that pressure exerted on the work never exceeds a given amount, even if the operator holds the control pedal at full stroke.

These pinion-shaft forgings, used in geared chain hoists, have a mean diameter of about ¾ in. V supports are set about 4 in. apart in the press, but the shaft rests in these supports only when pressure is applied. The shafts are loaded on rocking centers. The brackets holding the centers are made so that they rock against springs when the ram applies its load. In doing so, the work is forced into the V supports while it is being straightened.

As the ram raises, the centers with the shaft rock upward and the shaft can be rotated by hand while the ball of the dial indicator rests against it, showing whether or not it is straight and, if not, how much further straightening is required. In some setups of this type, a good operator can straighten 120 to 150 spur gear pinion shafts an hour.

In the case of the long pinion shaft shown in the accompanying illustration, used in a cable hoist, the checking is done with a master pinion enmeshed with the pinion on the shaft. With this, the indicator measures the deflection of the master caused by runout of the shaft. Straightening has to bring this deflection below 0.001 in. for the part to pass inspection. Shafts of this type are straightened at the rate of 20 to 40 an hr, depending upon the size of pinion.

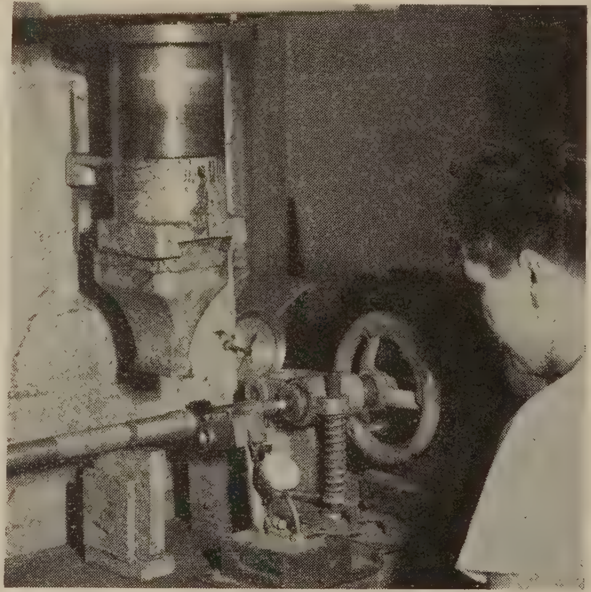
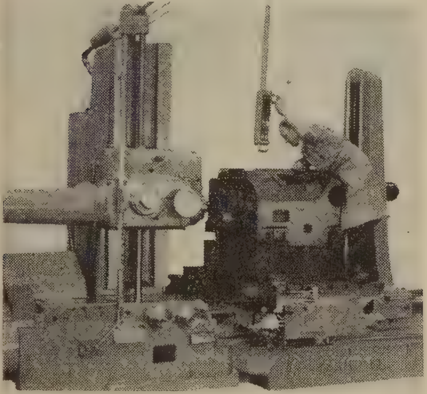


FIG. 1—This Hanafin press equipped with floating centers, two adjustable V supports and a dial indicator, is used to straighten pinion shafts used in Yale cable hoists.

New Production Ideas . . .

Boring, tapping, and second operation machines, and small tools including counterbores, box tools, and pencil size broaches are described this week. Other units discussed are a deburring-polishing machine, twin-tank degreasers, industrial circuit breakers, a rotating rod carrier, heating and cooling coils, a take-up bearing and a nameplate marking machine.

PRECISION horizontal boring, drilling and milling machines are being manufactured in 3, 4, 5, and 6-in. spindle sizes with both electrically and mechanically controlled models. The new mills are equipped with automatic power positioning for both table and head, allowing the operator, using dial indicators, to accurately repeat spacing operations, either horizontally or vertically, thus eliminating jigs or fixtures. They have a one piece ribbed bed, deep box construction that extends beneath the column and table with two or four ways for table and saddle support. Ways are hand fitted and fastened to make them an integral part of the bed or the frame. These mills have one spindle with both high and low speeds. On high speed work, the spindle is directly driven by V belts and all vibrations are dampened by the fly wheel action of the by-passed low speed gears. Pendant control on 3 and 4-in. spindle machines start, stop, jog and reverse the spindle rotation. The 4-in. spindle model 460 and 5 and 6-in. spindle machines are equipped with pendant directional control for spindle rotation, feed and rapid traverse selection for movement of any unit. Work ranges cover 36x36 in. to 94x84 in. Speeds range from 7½ to 850 rpm on 5 and 6-in. machines to 13½ to 1500 rpm on the 3-in. spindle machine. *Lucas Machine Div. New Britain Machine Co. For more information, check No. 1 on the attached postcard.*

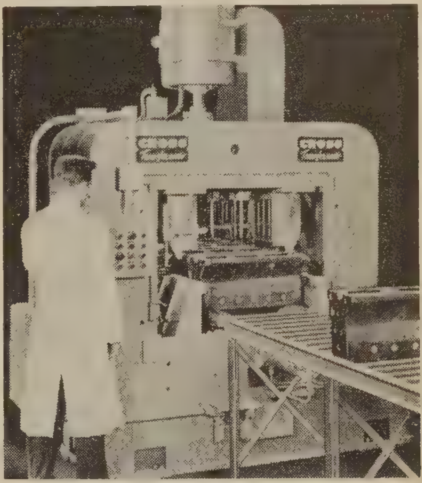


Second Operation Machine

THE new model AC59 high speed precision second operation machine features an air-operated collet. Chucking time is fast as the collet is operated by a foot pedal that opens and closes an air valve that instantly operates the collet. The collet will hold work without distortion even though there is considerable variation in the chucking diameter from one piece of work to another. The preloaded ball center-drive headstock spindle offers 1 in. round, ⅞ in. hexagon, and ¾ in. square collet capacity and step chuck capacity to 6 in. The standard 5C Hardinge collet or step chuck may be instantly closed or opened when the spindle is at rest, or at any speed to 4000 rpm. Eight spindle speeds are available in either forward or reverse direction from 250 to 4000 rpm. Other features are precision hardened and ground dovetail bed ways, constant full bearing double tool cross slide, and an automatic indexing six-position preloaded ball bearing turret. *Hardinge Bros., Inc. For more information, check No. 2 on the attached postcard.*

Tapping Machine

TAPPING pan rails and ends of 130 cylinder blocks per hr at 100 pct efficiency is possible on a special multiple spindle tapping machine. Four stations are provided; the first and fourth for loading and unloading. At the second and third stations, 30 holes are tapped in the pan rail, 14 holes in the front face and six holes in the rear face. The operator positions the block in the loading station and presses the cycle button. Parts are automatically machined and transferred from station to station. Special features include individual lead screw feed and the use of standard Cross sub-assemblies to provide flexibility for reasonable part design changes. *Cross Co. For more information, check No. 3 on the attached postcard.*

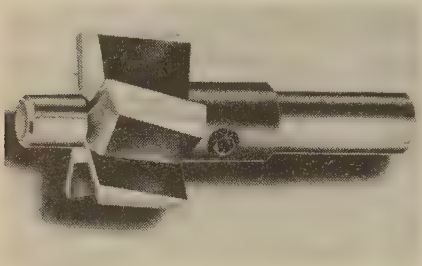


Brazing Machine

AN automatic gas-fired machine developed to braze ventilating ribs to tapered steel tubes is equipped with six high-velocity, superheat burners and 24 open-flame burners. The burner system, controlled automatically to give the required heat input and time, is positioned for an exact brazing-heat pattern. The area heated by the six burners is brought to approximately 1300°F and controlled to maintain the tubes at room temperature 1 in. from the working area. The machine 6x2½x1¾ ft, consumes 390 cu ft of gas per hr. A combustion controller supplies the correct combustion mixture of gas and air. The installation is equipped with fire checks and safety blowouts. *Selas Corp. of America. For more information, check No. 4 on the attached postcard.*

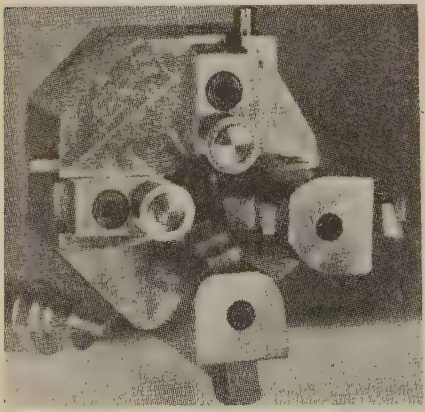
Counterbore

A NEW counterbore features extra heavy tooth construction, extreme shortness (2-in. overall length) more flutes for cleaner and smoother cutting, and positive chip clearance. The cutting edge is of sufficient thickness to dissipate heat quickly, making possible faster feeding. The counterbore has interchangeable pilots available in all sizes. It is produced in a complete range of sizes in straight shanks for chucking in drill motors and drill presses on tapered shanks that can be used directly in the machine spindle without holders and adapters. *Aircraft Tools, Inc. For more information, check No. 5 on the attached postcard.*



Box Tool

A NEW small box tool has capacity of ¼ to 1 1/16 in., with tool body 3½ in. square and shank 1 or 1¼ in. Tool bits used in the tool are ⅜ in. and locked in a broached hole that prevents tool drift, by 5/16 in. Allen set screws. The two tool arms are so locked in the body that while adjustable to center, they are rigid, maintain good concentricity when taking heavy cuts. Tool arrangement on each tool arm is the reverse of the opposite tool arm permitting different tooling combinations. Rollers and roller pins are hardened tool steel. The three tool holes on each tool arm are so spaced that they cover 1⅜ in. from the front of the first tool to the rear of the third tool. *Multi-Micro Cut Tool Co. For more information, check No. 6 on the attached postcard.*

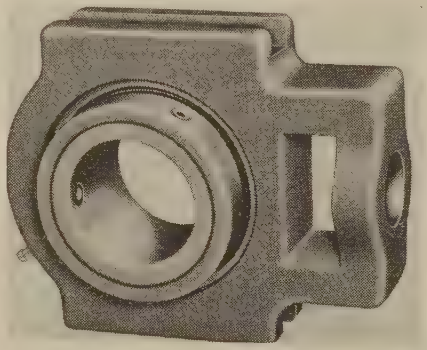


Bearing Tool

WORN sleeve bearings can be removed from motor endplates with a new tool that consists of a steel rod accurately finished to accommodate precision bored bearings on one end and unbored bearings on the other. A central shoulder separates the two ends. The bearing tool is available in four sizes for motors with finished bearing sizes of 0.655, 0.751, 0.812 and 1.062 in. *Wagner Electric Corp. For more information, check No. 7 on the attached postcard.*

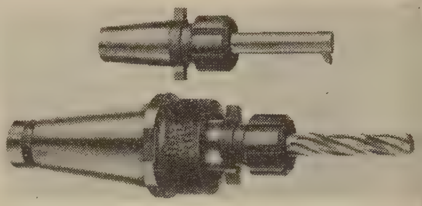
Take-Up Bearing

A NEW ball bearing take-up unit consists of a deep groove precision bearing with large balls and retainer to minimize wear, enclosed in a rugged outer housing with wide milled slots or ways on each end for supporting guides. The housing has a hole for receiving the unthreaded end of an adjusting screw. This take-up bearing is suitable for conveyer and power transmission service where provision must be made for changes in shaft position. *Dodge Mfg. Corp. For more information, check No. 8 on the attached postcard.*



Tool Holder

TOOL changes in less than 10 sec without loss of close tolerance accuracy is claimed for the new Kwik Switch tool holder. The unit has been developed for changing tools on jobs requiring multiple operations such as drilling, tapping, and boring. A master chuck fits into the machine and adapter chucks that hold the tools fit into the master chuck, fastening by hand of the locking nut. Consecutive operations may be performed without readjusting the tool, machine, or changing position of the work. Kwik Switch holders handle tools with either straight or taper shanks. The master chuck is available in straight and taper shanks to fit all standard machine tools. *Universal Engineering Co. For more information, check No. 9 on the attached postcard.*

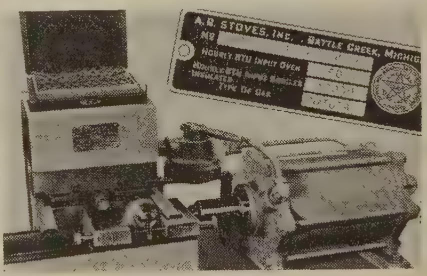


Pencil-Size Broach

FOR small keyway jobs a small Glenny broach cuts 1/16 in. wide keyways up to 0.070 in. deep. The broach features protected blade, simple operation, chatter elimination, absolute centering, maximum adjustability of cutting depth, and rapid keyway cutting. It is fabricated of quality steels; the blade has a 63 to 65Rc hardness and the tool body and nuts are 43 to 45Rc. *Kase Machine Co. For more information, check No. 10 on the attached postcard.*

Nameplate Marking Machine

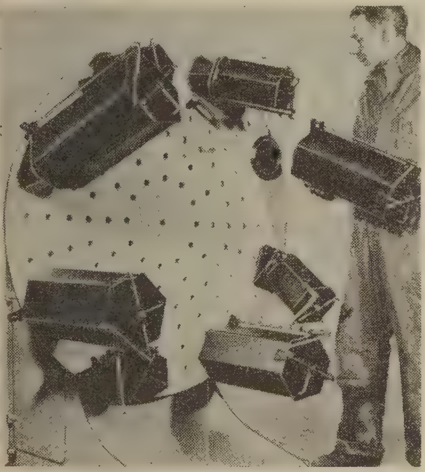
FOR production marking of nameplates where there are frequent changes in character alignment and nameplate size, a compact bench style pneumatic marking machine will mark a nameplate 5½x4 in. when marking area is in the center of the plate. Maximum marking area is 3x2¾ in. when an air cylinder with a 5-in. stroke is used; 4½x2¾ with a 6½ in. stroke air cylinder. T-face steel type for use with the machine is hardened and tempered tool steel and precisioned to give controlled marking depth. Three standard sizes, 1/16, 3/32, and ⅛ in. are available. Normal type change takes only a fraction of a minute,



permitting high speed serial numbering of plates when required. *Jas. H. Matthews & Co. For more information, check No. 11 on the attached postcard.*

Deburring-Polishing Machine

FIFTEEN different metal or plastic parts can be handled at the same time without mixing, on the new Multi-Barrel Tumbler and each can be tumbled in the manner best suited to its requirements. The variables include wet and dry tumbling; wide range of speeds; rotary, centrifugal and end-to-end actions, and combinations of these actions. A circular mounting plate, with multiple perforations at center and six distances from center for attachment of the barrels, is rotated at a fixed speed. The barrels, of numerous lengths and diameters, are round, hexagonal, clover-leaf, or special cross-section, with or without Neoprene lining. Seventy-three standard units are available. Barrels are mounted at right or other angle to the plate, providing selection in severity of action. *Hungerford Corp. For more information, check No. 12 on the attached postcard.*



Plating Hook

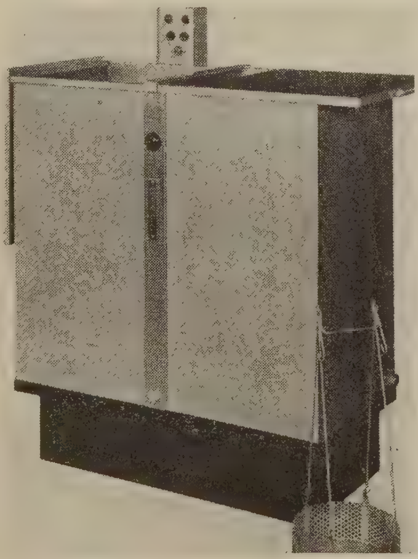
PLATING hooks for eliptical anodes allow the entire anode to be completely immersed in the plating solution, cutting anode scrap as much as 50 pct, it is stated. The hook is usable over and over, since it withstands all plating solutions and temperatures. It features a specially designed cap of Neoprene rubber that fits over the top of the eliptical anode. Rubber shoulder-like projections protect the center section of the anode where the threads of the hook fasten into the anode proper. When the hook is turned tightly into the anode, its pressure against the cap seals the anode top to the hook and does not permit plating solutions to seep into the section where the hook threads enter the anode. The hook comes in 6 and 8-in. sizes fitting anode rods up to 1½ in. diam. *Udylite Corp. For more information, check No. 13 on the attached postcard.*

Water Wash Compound

A WATER wash compound for paint spray booths lubricates the overspray. Identified as Northwest Number One, it coats each particle of paint with a non-volatile solvent and any overspray so lubricated does not stick to the booth or any of the eliminators. The booth keeps clean and the sludge remains floating for easy skimming. Downtime for booth cleaning and baffle stripping is eliminated and operators work in clean air at all times. *Northwest Chemical Co. For more information, check No. 14 on the attached postcard.*

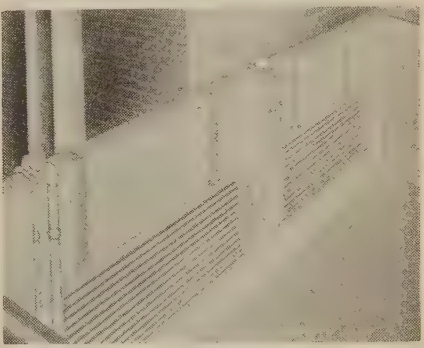
Twin-Tank Degreasers

THE new Chief twin-tank degreaser is an electrically heated, thermostat-controlled machine, with a stainless steel hot vapor tank for automatic vapor degreasing and a galvanized steel dip tank for flushing, dipping and soaking parts to be cleaned. The hot vapor tank, 18x18x32½ in., takes 5 gal of non-explosive and non-inflammable Per-Solv solvent that is vaporized by heat applied externally through 220 v electric heating elements. The hot vapor surrounds the work suspended in the tank, penetrating grease and oil to the bare metal, where it condenses and washes the soil down to the bottom of the tank. A thermostat near the top of the tank controls the vapor height, preventing loss of vapors into the atmosphere. Another thermostat automatically shuts off the heat when the Per-Solv mixture is too contaminated with grease and oil for further use. An indicator light shows operating conditions at all times. The adjacent dipping and flushing tank takes 20 gal of solvent. *Circo Products Co. For more information, check No. 15 on the attached postcard.*



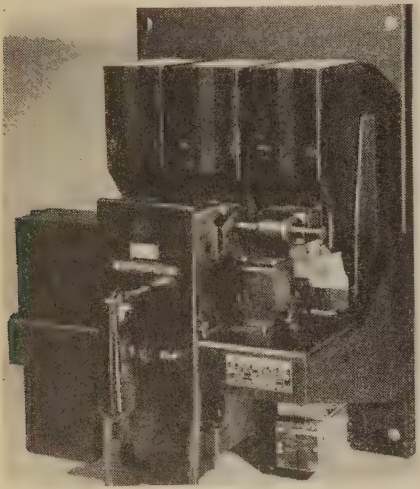
Heating-Cooling Coils

A NEW heating and cooling coil for plating, degreasing, pickling and anodizing tanks consists of embossed metal plates permanently welded together. Advantages include higher Btu capacity per square foot of area, rapid even heat transfer, small coil space, easy installation, and low maintenance cost. Heating or cooling can be done with the coils that fit practically every size and design of tank. Because of the generous passage for the heating or cooling agent, and its high ratio of prime surface, the Platecoil develops an extra high rate of heat transfer. Platecoils can be removed and replaced by new units without shutdown. They are available in cold rolled steel, stainless and Monel, and in two styles. *Udylite Corp. For more information, check No. 16 on the attached postcard.*



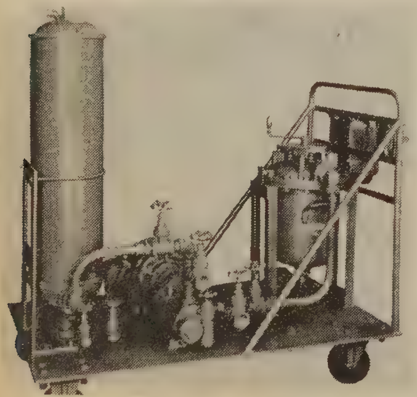
Industrial Circuit Breakers

A LINE of 600 v dc or 250 v ac circuit breakers has accurate tripping characteristics for low-voltage power distribution in industrial plants, motor starting duty, etc. Accurate control for long time delay with protection from tapering is provided by a time-delay element assembled in a hermetically sealed tube. Maintenance is simple: attachments and parts can be removed or added without drilling or moving other parts. Complete shielding of live parts assures safety. Breakers are available for overcurrent protection with delayed and instantaneous tripping for use on motors and for general purposes, or for overcurrent protection with both long and short delay for proper coordination in selective protection on fault current. The Db-15 has an interrupting rate of 15,000 amp with load current ratings up to 225 amp at 600 v ac or 250 v dc; DB-25 for load currents up to 600 amp with an interrupting capacity of 25,000 amp. *Westinghouse Electric Co. For more information, check No.* 17 *on the attached postcard.*



Portable Transfer Unit

A PORTABLE transfer unit that also can be used for the finest filtration of fluids is mounted on a truck with an electrically driven pump, a metal edged strainer and micronic type filters. In transferring the fluid the valves are so arranged that either one, both, or neither of the filters are used. Standard capacities are 5, 10, 15, 20, 40, 50 and 80 gpm. The units can be furnished with suction and discharge hose assemblies.



A push button starts the pump motor and the unit operates from any standard electrical terminal. *J. S. Fauver Co. For more information, check No.* 18 *on the attached postcard.*

Flexible Insulated Leads

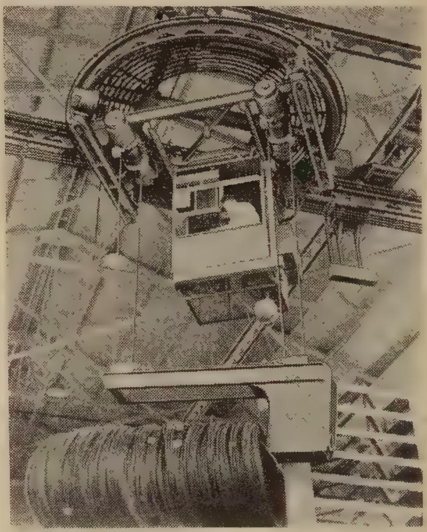
PLUG-IN leads with a special flexible plastic insulation incorporate all types of insulated stranded wire and feature precision positioning of the jack-pin. These leads are manufactured on automatic machines that mold the plastic snugly around the wire. With high dielectric properties, flexibility, and low shrinkage, the plastic insulation is practically irremovable. The material is not affected by oil, grease, age or sunlight, and will withstand temperatures up to 170°F. *Aircraft-Marine Products, Inc. For more information, check No.* 19 *on the attached postcard.*

Sloped Bottom Box

SMALL parts handling is simplified with a new sloped bottom box and stand that operates by a hand lever located on the box. Release permits the parts to slide down to a waist-high tray on the stand for easy disposal by standing or sitting workmen. The box is all steel and equipped with crane lugs for convenient pick-up and carry. It is built to fit any type lift truck, fork or platform. Gravity flow of the parts from box to tray eliminates hand operations. *Palmer-Shile Co. For more information, check No.* 20 *on the attached postcard.*

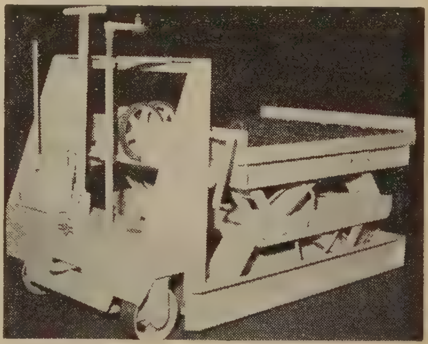
Rotating Carrier

A ROTATING carrier for handling coiled rod and wire consists of a crane that travels the length of a storage building, a trolley that travels on the bridge from side to side of the building and a rotating carrier that operates on a circular track built into the trolley. The carrier has two separate hoists, cables from which are reeved to the two ends of a hairpin hook. All motions are controlled by the operator in the cab attached to the carrier. The carrier turns clockwise or counter-clockwise through short arcs or complete turns, thereby turning the hook to any direction desired. The hook can be raised, lowered, and tilted upwards or downwards by separate or simultaneous operation of the hoists. The unit illustrated carries 3500 lb of rod in addition to the weight of the hairpin hook. *Cleveland Tramrail Div. Cleveland Crane & Engineering Co. For more information, check No.* 21 *on the attached postcard.*



Die Truck

CHANGING heavy dies can be facilitated with a die handling truck of 16,000 lb capacity and hydraulic elevation of the 48x 57-in. platform. A roller top of five rows of rollers placed on 4-in. centers aids in transferring the heavier dies. With the roller top in place, the platform can be lowered to 24 in. or elevated to 38 in. The roller top can be removed and the dies supported by a flat steel top. Four



hydraulic hoists operate against toggle levers. A two speed hand pump operates the hoists and a finger tip release lever controls the lowering speed. The hand winch, used to draw dies on the table is geared to a 96:1 ratio and is supplied with 25 ft of steel cable. The truck can be secured by a screw type lock that engages the floor. The equipment is available in a range of top sizes and different capacities. *Lyon-Raymond Corp. For more information, check No. 22 on the attached postcard.*

New Aluminum Alloy

A NEW aluminum alloy, designated as 150S, is a general-purpose specification alloy that combines properties intermediate between the common alloys 3S and 52S. Yield strength is intermediate between 3S and 52S. Workability is approximately equal to that of 3S and its finishing characteristics superior to 3S. Corrosion resistance is superior to 3S and welding and brazing characteristics are intermediate between 3S and 52S. *Permanente Products Co. For more information, check No. 23 on the attached postcard.*

Nylon Anode Bags

NYLON anode bags to cover nickel, copper, silver, zinc and other metal anodes used in electroplating solutions maintain their strength in both acid and alkaline solutions at temperatures up to 150°F for long periods of time. The bags are made of sturdy nylon of 66x48 in. weave and are stated to be over 50 pct stronger than comparable cotton bags. Bags are ordinarily supplied 4 in. longer than the length of the anode to allow accumulation of sludge, and a nylon draw cord is provided. *Enthone, Inc. For more information, check No. 24 on the attached postcard.*

Air-Water Operating Valves

A QUICK-OPENING lever that may be adjusted to any horizontal position is a feature of a new self-sealing air or water operating, ball type valve. The ball valve closes tight with inlet pressure and will not collect dirt or other foreign matter. The stem is sealed by an O-ring. It is self-packed by the operating pressure when the valve is open, permitting flow. The valve is suitable for use with air, water, and other fluids of a non-corrosive nature up to 200 psi pressure and temperatures up to 150°F air and 180°F water. The valve has a cast semi-steel body, integral rubber seat insert, and ½ in. screwed connections. *Leslie Co. For more information, check No. 25 on the attached postcard.*

Welding Covers

WELDING curtains of Army Duck weighing 10 oz per sq yd and treated with Hooper Fire Chief have been designed to confine the welding operation to a given area and protect other workers from the direct rays. Standard curtains have eyelets across the top spaced 10-in. apart and two in each lower corner. They may be suspended on a horizontal rod or pipe support by hooks or lacing. Double row stitching is used on all seams. *A. Smith & Sons. For more information, check No. 26 on the attached postcard.*

New Grind for Collets

IDENTIFIED as Cloverleaf, a new grind on the external bearing surface of Sheffer collets provides a cam relief at the slots so that a positive bearing is obtained in the center of each jaw section. This new grind is applied to all collets for hex, square, and round stock. The cam form is said to provide a tighter lock with less strain on the chucking mechanism and free release regardless of stock variations or worn conditions of either collet or spindle. The amount of contact surface on the bearing and the amount of relief are controlled by a master cam assuring scientifically correct proportions and uniformity. *Sheffer Collet Co. For more information, check No. 27 on the attached postcard.*

Thermocouple Indicator

A NEW, high temperature indicator for general, non-critical use is claimed to be accurate within a fraction of a scale division. Calibrated for Iron-Constantin or Chromel-Alumel thermocouples, a choice of several scale ranges is available. Known as the Model XA-100 Xactemp indicator, it is furnished enclosed in a metal case suitable for either flush or surface mounting. A plug-in lead-wire connection provides easy handling. *Claud S. Gordon Co. For more information, check No. 28 on the attached postcard.*

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Information Free . . .

MAGNETIC HOLDING METHODS are described in booklet. Chucks and holders for use in planing, milling, grinding, turning, facing, boring, general materials handling and other operations are discussed. *Rockford Magnetic Products Co., Inc. For more information, check No. 29 on the postcard.*

DIECASTING MACHINES for producing small, medium, heavy and outsize castings are discussed in booklet. Specifications for plunger and gooseneck type machines for zinc, lead and tin; and cold chamber machines for aluminum, brass and magnesium are given. *Miller-Taylor Tool Co. For more information, check No. 30 on the postcard.*

HEATING ELEMENTS bulletin 20 contains detailed capacity and dimension tables for both 1¼ in. OD x 16 Bwg and ¾ in. OD x 18 Bwg tube elements. Installation instructions and diagrams of commonly-used heater arrangements for hot water generation are included. *Davis Engineering Corp. For more information, check No. 31 on the postcard.*

HOSE ACCESSORIES, including couplings, clamps, air valves and manifolds, are discussed in catalog 149. Throttle valves for compressed air lines, air hammer and special high pressure hose couplings, long shank couplings for low pressure steam and other items are shown. *Hose Accessories Co. For more information, check No. 32 on the postcard.*

FLEXIBLE METAL HOSE, bellows and expansion joints catalog G-50 gives descriptions and specifications for flexible metal hose in a variety of metals, and contains information on expansion joints, stainless and brass bellows and various assemblies of components. *Chicago Metal Hose Corp. For more information, check No. 33 on the postcard.*

DRILLS catalog 48 gives information on 2165 listings, conforming with all changes in drill dimensions made by the American Standards Assn. Technical section of the catalog contains information on cutting fluids, crankshaft pointing and pointing of drills. *Ace Drill Corp. For more information, check No. 34 on the postcard.*

BURS AND ACCESSORIES catalog illustrates the shapes and sizes available and illustrates a variety of the jobs done. A special carbide bur, ground from solid blanks and center-fluted, particularly designed for die steels is announced for the first time. *Pratt & Whitney, Div. Niles-Bement-Pond Co. For more information, check No. 35 on the postcard.*

HOLE PUNCHING UNITS for mild steel up to ¼ in. thick are described in catalog CJ. Holes up to 1⅛ in. diam can be punched. The units permit adjustable straight line, scattered or staggered punching. Units for shaped holes and notching are also discussed. *Wales-Strippit Corp. For more information, check No. 36 on the postcard.*

STOCK RACKS, collapsible boxes and other materials handling items are described in bulletin. Stock racks for coiled materials, heavy duty pallet racks, and accessories for adding flexibility to the portable stock racks are featured. *Equipment Mfg., Inc. For more information, check No. 37 on the postcard.*

HYDRAULIC OILS folder gives data on a series of oils processed to insure high viscosity indexes, increased oxidation stability, high demulsibility, positive lubricating value and corrosion preventive qualities. *Swan-Finch Oil Corp. For more information, check No. 38 on the postcard.*

MOBILE CRANE AND CARRIER, featuring a folding crane boom which permits easy highway operation, is discussed in bulletin 249. Truck-type chassis, capable of 35 mph, has a ¾-cu yd upper deck capable of lifting crane loads up to 20 tons. *Byers Machine Co. For more information, check No. 39 on the postcard.*

MILLING AND CENTERING machines, of indexing and continuous types, are described in bulletin 170. A chain clamping feature said to eliminate excessive cutter wear and breakage due to poorly clamped parts is a feature of the machines. *Davis & Thompson Co. For more information, check No. 40 on the postcard.*

PROTECTIVE COATING, applied like a lacquer to masonry, metal and wood, is discussed in technical data folder. The coating resists acids, alkalies, alcohol, oil and water, and is flame and heat resistant. *Prufcoat Laboratories, Inc. For more information, check No. 41 on the postcard.*

BLOWERS AND EXHAUSTERS of the centrifugal type are covered in bulletin B-5-A. Single and multi-stage steel and cast iron units are illustrated. Blowers for poisonous or explosive gases are available. *Lamson Corp., Allen Billmyre Div. For more, check No. 42 on the card.*

GRAY IRON CASTINGS in which the irons used are specially made in electric furnaces to provide the optimum iron for product requirements are described in 32-page booklet. Special service gears and other parts are shown. *Frank Foundries Corp. For more information, check No. 43 on the postcard.*

BLAST FURNACE GAS BURNERS are described in bulletin 500. Design diagrams of a variety of burners for waste and primary fuels are included. Individual burners have capacities from 20 million Btu per hr to 120 million Btu per hr. *Peabody Engineering Corp. For more information, check No. 44 on the postcard.*

POWER HACK SAWS for metal cutting requirements up to 6¾ x 6¾ in. bars are described in bulletin. An adjustable pressure feed control which permits application for the proper pressure for maximum cutting speed is featured. *Keller Tool & Machine Works. For more information, check No. 45 on the postcard.*

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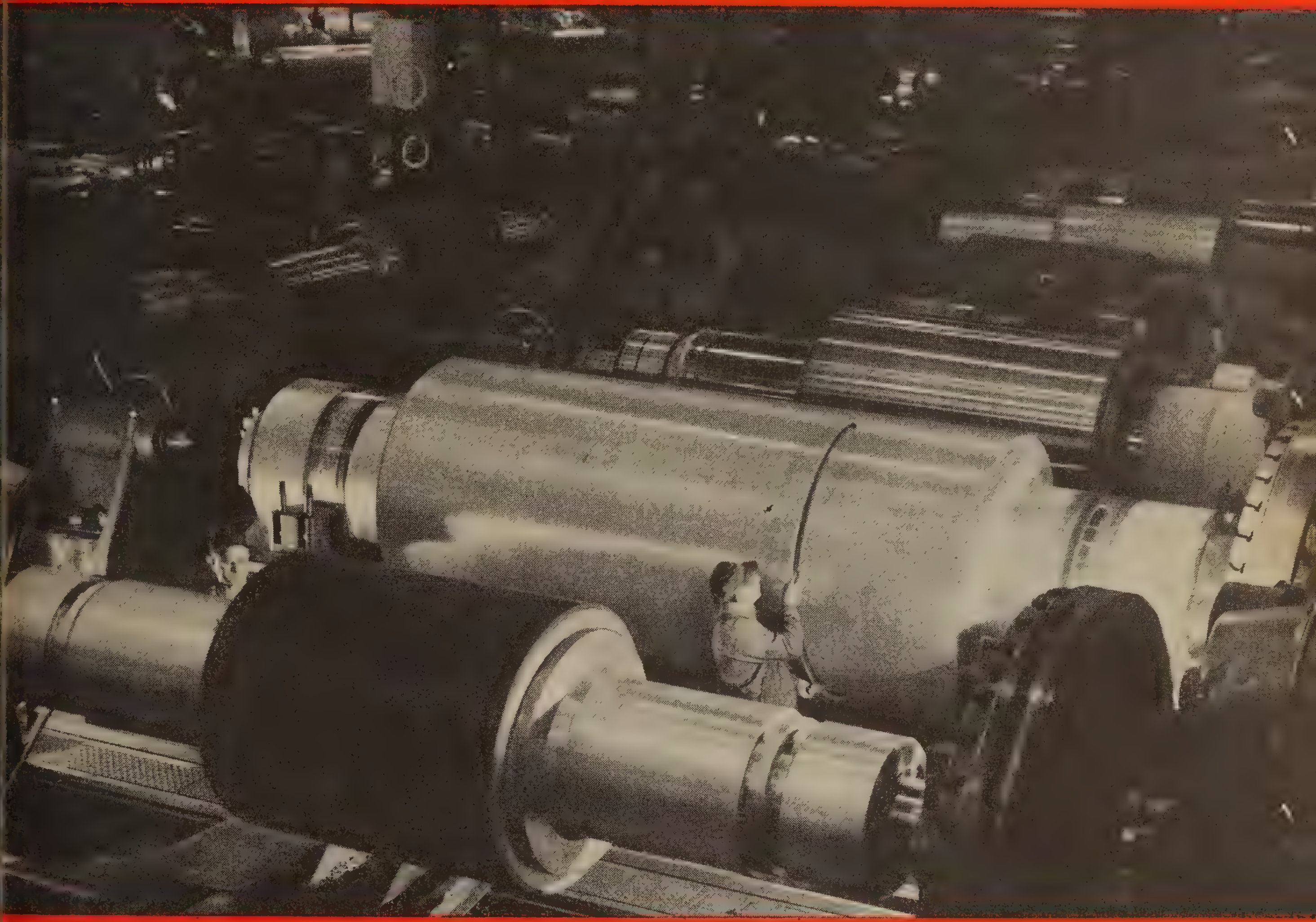
MESTA ROLLS



A section in one of the Mesta Roll Shops

Mesta produces all sizes of iron and steel rolls including the largest used in industry today. Efficient plant equipment, skilled workmen with long service records, an engineering staff whose technical ability has been accumulated over many years—these resources are responsible for Mesta's leadership in the production of the finest in rolls and other rolling mill equipment.

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Assembly Line . . .

WALTER G. PATTON

• Ford strike idles 135,000 workers . . . Impasse at the Rouge will ease demand for steel still further . . . Henry Ford II calls strike "bad and unnecessary."

DETROIT—One day last week 27 men sat around a table at Detroit's magnificent Rackham Bldg. As is usual in such meetings, the number of union representatives outnumbered management — on this occasion nearly 2 to 1. As is also usual the large number of delegates present had made it most unlikely that agreement would be reached (IRON AGE, Feb. 17, 1949, p. 106).

Curiously enough, the meeting was held in a building that was built by the earnings returned to one of Ford's original investors, Horace Rackham. If Horace Rackham happened to be looking down at the proceedings here last week he must have found the situation puzzling indeed. For here was Ford management discussing at the conference table with labor representatives questions which the elder Ford discussed with no one. Henry Ford I set his own pace. Meanwhile, he rewarded workers with the highest wages they had ever earned; customers got Ford cars at the lowest prices on record; and investors like Horace Rackham earned profits on their investments they had never even dreamed about.

The industrial wheel had made a complete cycle at Detroit. Small wonder it stuck on dead center when the union questioned what the Ford Motor Co. regarded as a fundamental right — the right to control completely its assembling operations. The company had agreed to allow its practices to be reviewed by an outside arbiter; it would not permit the union to decide through collective bargaining the number of workers who would be used to man a Ford assembly line.

The meeting in the Rackham Bldg. was the third conference of Ford and UAW-CIO representatives in 2 days. If there was even a scintilla of hope that agreement would be reached on the "speedup" issue, it was not mentioned by anyone.

Looking through the round glass window in the door, one could see a small man with dark, almost auburn hair, talking earnestly across the table to John Bugas, Ford director of industrial relations and formerly Detroit FBI head. Mr. Reuther carried his right arm in a sling but his left hand shot out impatiently at frequent intervals as he sought to emphasize the points he was making.

Walter Reuther, who had not attended the first two meetings, was a prominent participant in the conference held at the Rackham Bldg.

At 11:55 Mr. Bugas got up to answer a telephone call. At a few minutes after twelve he returned to the conference room. A brief discussion followed. Slowly the delegates began to get up. Soon all in the room were standing. No agreement had been reached. Nearly 15 min previously, Ford workers at the Rouge plant had laid down their tools and began filing out of the plant.

AS the meeting broke up, Mr. Bugas brushed aside newsmen without comment. This gave Mr. Reuther an opportunity he likes: to spell out, step by step, the union's strike position. For nearly an hour he painstakingly described the union's side of the controversy, explaining the steps leading to the strike, emphasizing at every opportunity the efforts the union had made to avert a strike. As usual, he put a good face on the union's cause. But would it be good enough to hold water with 135,000 unemployed Ford workers after they have been idled for several months as the result of a controversy with Ford which many observers feel strikes at the very heart of management?

The Ford stoppage has in it as many elements of bewilderment as any strike the auto industry has seen. The "speedup" issue was obviously not Mr. Reuther's first choice. On May 16, negotiations were scheduled to start on $100 per month pensions for Ford workers. While Mr. Reuther gave it as his opinion that the new contract negotiations are presently unaffected by the Ford strike, it is difficult to see how this could be, especially since the present impasse may extend beyond the contract expiration date of July 16.

From the Ford Co.'s standpoint, the present work stoppage may not be as ill-timed as some sources believe. Assuming Ford is unable to build up banks of cars in dealers hands, it is argued, there is no net difference to the company insofar as lost car production is concerned if a strike is called now or later. Where the company may gain lies in the fact that the alleged "speedup" has been called against Henry Ford II, the man who has established himself unquestionably as labor's most sincere friend in the auto industry. Moreover, the strike has been hinged to the fundamental question of management's rights to control the speed of its assembly lines.

THE preliminary exchanges between Ford and the union were bitter. As often happens, management was openly charged with "bad faith" and "double dealing." The company called the

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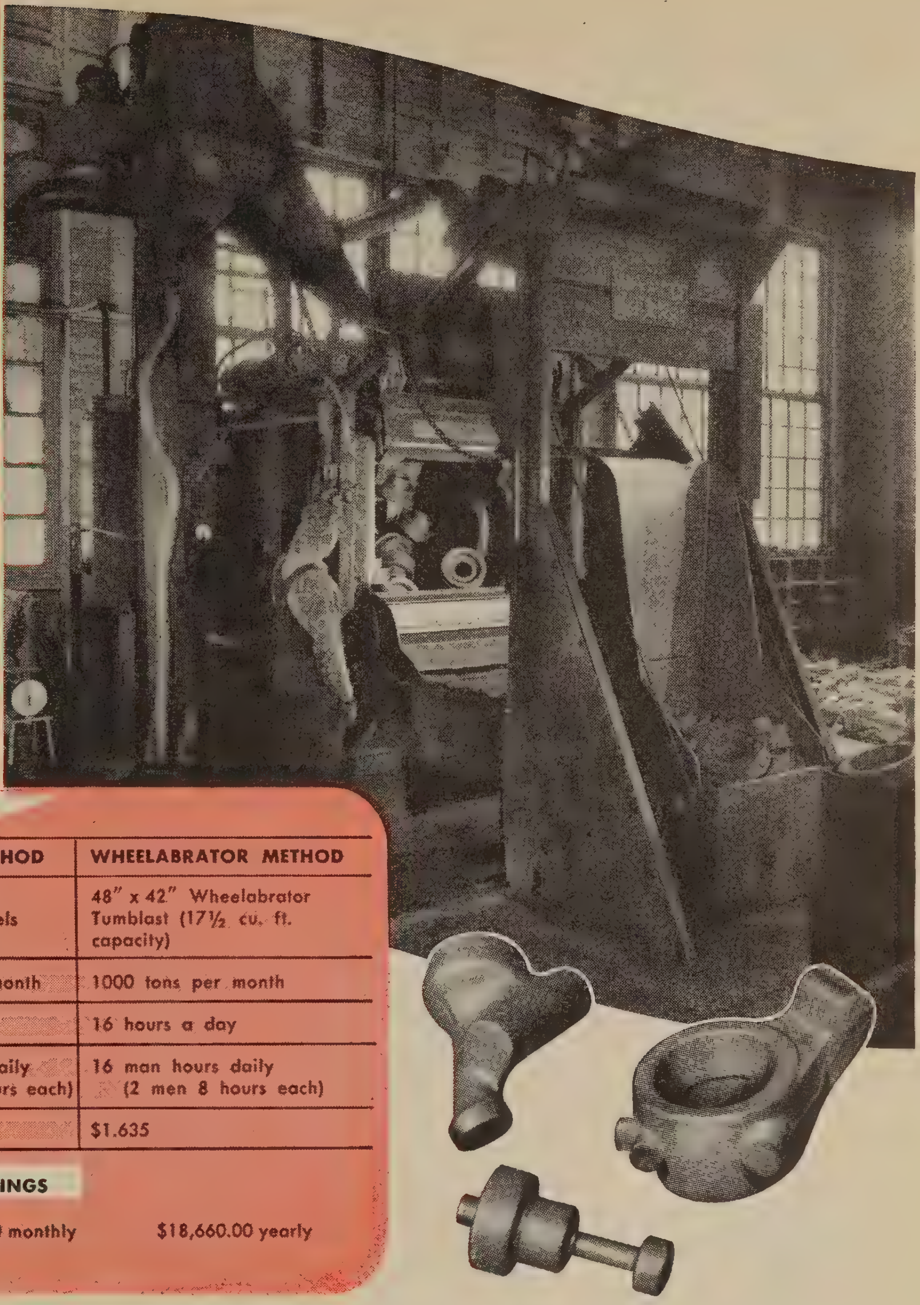

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Time Required:	16 hours a day	16 hours a day
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Cost per ton:	$3.19	$1.635

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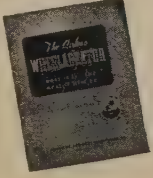

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charges "baseless" and offered to submit the dispute to arbitration.

"The union wants an agreement with the company setting the speed of the assembly lines. (Ford) policies do not require any employee to do more than a reasonable day's work in 8 hr. Wherever your union has cause to believe that we are overworking an employee or group of employees to the possible detriment of health or safety, we have a device in our contract whereby we can bring in an outside impartial arbiter to settle the matter for both of us. The union has persistently refused to bring in an impartial industrial engineer," Ford said.

Explaining his reasons for not arbitrating the dispute, Mr. Reuther said that arbitration would settle nothing and was, therefore, worthless in this circumstance. "Ford is merely trying to hide behind the skirts of arbitration," he charged.

Before the final bargaining session began the union proposed that Ford agree to bring its work standards on the assembly lines into conformity with the practices of other auto plants.

"The company insists on continuation of a practice that penalizes the employee for every dislocation in the production process by forcing them to make up lost production by working in excess of normal work standards. Under the company's practice," the union said, "the employee is forced to make up lost production, regardless of whether the loss is due to mechanical breakdowns, defective materials, power interruptions, inefficiency of management in scheduling an even flow of materials, etc."

Ford Deplores Strike

Detroit

• • • Henry Ford II in a letter sent to Ford employees has called the present strike, "particularly bad" and "unnecessary." From the point of view of any sane management, "speedups are silly," Mr. Ford said. "We cannot understand why the strike was called, unless it was prompted by some political situation in the union," Mr. Ford told the company's employees. John S. Bugas, Ford vice-president in charge of industrial relations, has turned down offers of Mayor Orville L. Hubbard of Dearborn and Acting Mayor George Edwards to attempt mediation of the dispute. Mr. Bugas explained the offers were being rejected whether they are "prompted either by politics or good intentions."

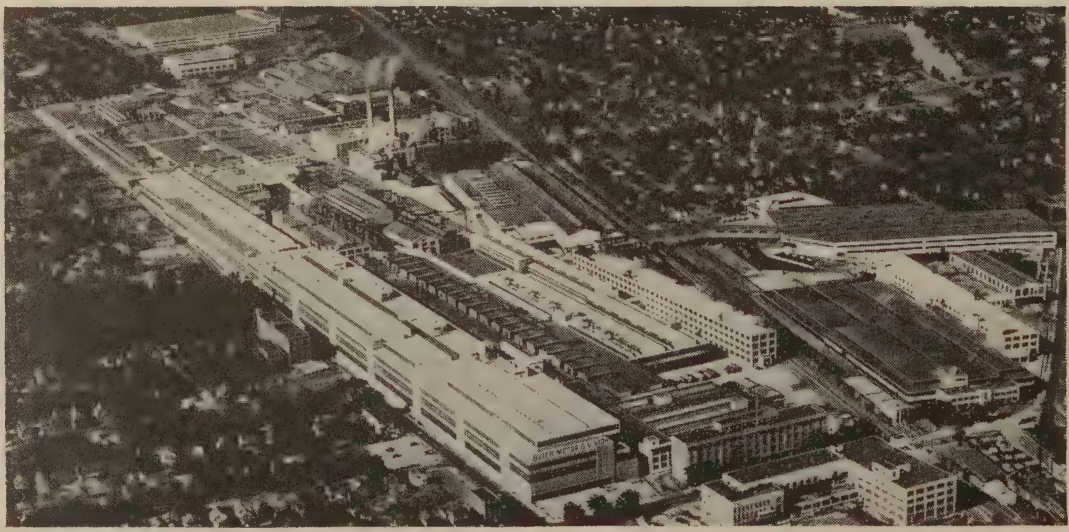
In Mr. Reuther's press conference it was charged that, despite a 20 min. breakdown in Ford's "B" building at a time the line was set for 42 jobs per hour, only 4 jobs were lost. (If output had proceeded at the previous rate, 14 jobs would presumably have been lost.)

Mr. Reuther said that the company's argument that it needed "flexibility" is baseless. He said assembly line rates are set by the manufacturers but the union reserves the right in all auto plants to challenge the spacing between jobs and the number of workmen along the line. This is at the heart of the Ford controversy since the union's insistence on approving the the number of workers on the lines is another way of saying it will control the output per worker.

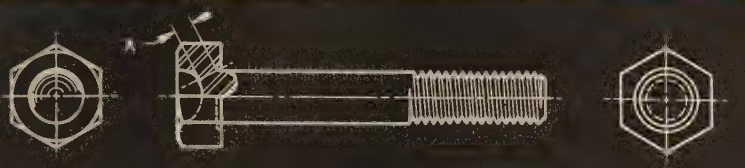
FORD'S answer to this challenge is that the company will accept an arbiter's judgment on worker productivity but not the collective bargaining verdict. The union's position is: we have a right to settle such issues in normal collective bargaining. "We won't allow an engineer or doctor to chain a worker to a given rate of work," Mr. Reuther told his press conference.

It is entirely possible that the Ford strike will idle 135,000 workers at Ford plants within a week. At the present time, 71,000 workers at Ford's Rouge plant and the Lincoln-Mercury plant are idle. Other Detroit units such as Highland Park and Mound Road will probably be closed within a few days. Ford assembly plants throughout the nation may hang on for a brief period. What the effect will be on Ford suppliers who are already experiencing some curtailment in orders remains to be seen.

Some sources are already willing to predict that Walter Reuther has picked the wrong issue—with the wrong man—at the wrong time. However, those who know Walter Reuther's uncanny ability to come back on his feet when the going is toughest, are not nearly so sure about this.

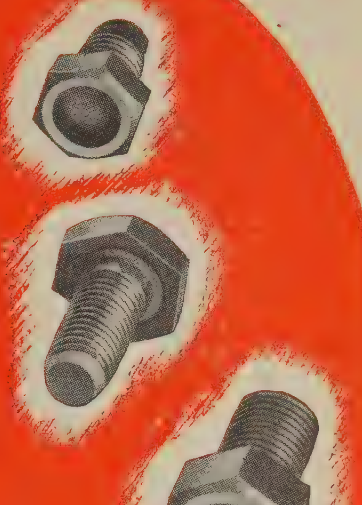


BUSY BUICK: *Deliveries of new Buick cars to customers during the first 3 months of 1949 were the greatest in the company's history. Production sights at Flint are set to continue at the present high rate. The Buick plant, one of the most self-contained in the entire GM family, now covers more than 300 acres and utilizes 7,500,000 sq ft of floor space.*



The "Place" type head is formed with a cup-like recess in its upper face and a circular recess in its under face adjacent to the shank. Between the radii of these recesses is formed a diaphragm (x) which acts as a spring element when the head is wrenched tightly against a rigid base.

U. S. Patent No. 1966044



DIAPHRAGM HEAD MAKES PLACE BOLT self-locking against VIBRATION

Critical problems of fatigue and involuntary loosening on automotive, aircraft, farm equipment, and other products have been effectively met by *self-locking* Place Bolts.

The unique "diaphragm" head design (see illustrations) produces an axial spring tension when the bolt is tightened, giving it extraordinarily high vibration resistance. Place Bolts may be used with nuts or in tapped holes, but should be used only where it is possible to tighten against a rigid seat.

Made of alloy steel, heat-treated to high physical properties, Place Bolts can be furnished in a wide range of sizes and may be developed for special applications. Typical examples include connecting rod bolts, main bearing cap screws, flywheel bolts and piston pin lock screws.

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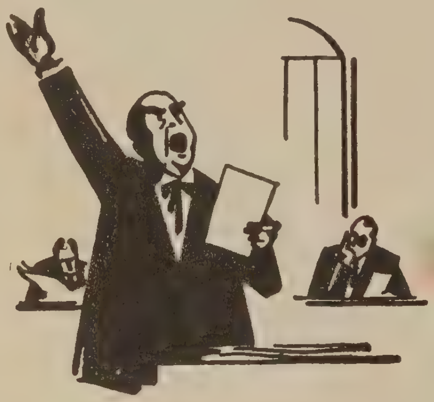
Washington . . .

EUGENE J. HARDY

• Latin America should be first to benefit from President's "Point Four" program . . . U. S. money already working South of Border . . . State Dept. favors treaties instead of government guarantees.



WASHINGTON—Despite an ever-increasing shortage of hard currencies, principally dollars, in most Latin American countries, the South-of-the-Border nations are likely to be among the first to benefit from the "Point Four" program in which President Truman called for improvement and growth of underdeveloped areas by spreading the benefits of our scientific advances and industrial progress. (THE IRON AGE, Mar. 17, p. 110.)

The United States has been lending a helpful hand in Latin America for many years through the work of the Institute of Inter-American Affairs, the Dept. of Agriculture, the Export-Import Bank, the World Bank, and many other groups, government and private. For instance, funds provided by the Export-Import Bank are being used to expand steel, power and other industries of Latin America. The State Dept. has indicated that further efforts will be made to widen these activities.

In furthering the "Point Four" program in Latin America, the basic problem is the same as will be encountered throughout most of the world, the creation of an economic climate that will attract both foreign and domestic investors, so that some degree of security may be achieved for those willing to risk their funds in the development of so-called underdeveloped areas. On this point there has been some talk of the United States guaranteeing investments of American firms contributing to the program. However, the State Dept. is not too warm to such a proposal and looks with more favor on treaties enacted by the developing nations guaranteeing proper payment when questions of expropriation arise, authorizing prompt transfers of currencies, and other such matters that have plagued American firms operating in foreign areas. Realizing the benefits that might be obtained from this new program, several Latin American countries are looking with favor on such proposals, Uruguay being the most recent example.

The need for a development program in Latin America cannot be questioned. Even in Brazil, which has made substantial progress in industrial development over the past 50 to 60 years, a broad development program in both industry and agriculture is needed, according to the recent report of the Joint Brazil-United States Technical Commission. This body was created pursuant to the request of Brazil for the assistance of U. S. technicians to work with Brizilian technicians in analyzing the economic status of the country.

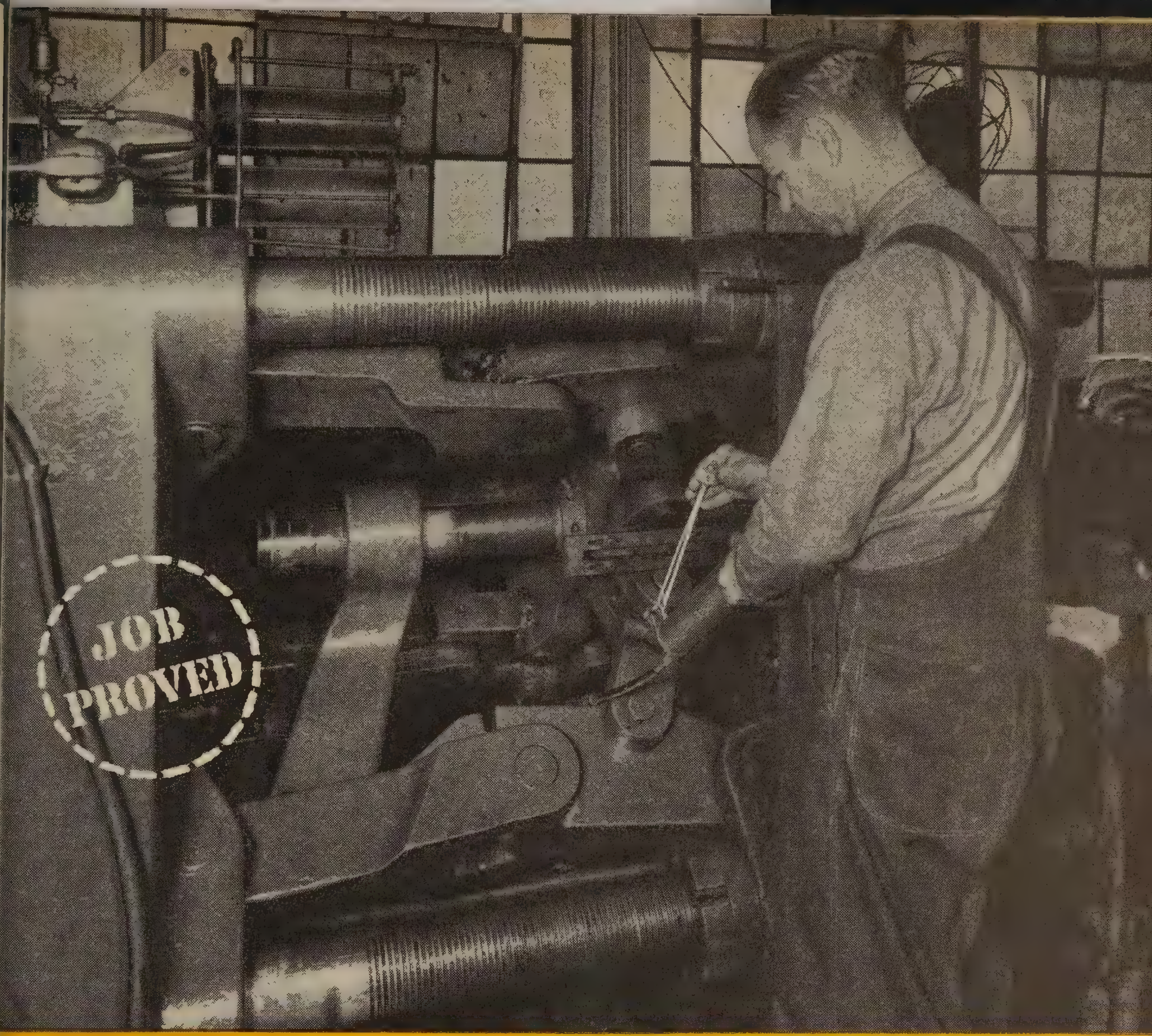
Among Brazil's basic problems, according to the Commission, is persistent foreign exchange difficulties. For this reason, foreign exchange and imports will have to be rigidly controlled for the immediate future so that currency will be available for essential imports.

FOR Brazil to make substantial progress industrially, the Commission found that the primary needs are those which the "Point Four" program is designed to fulfill, including "larger, more dependable, and if possible, cheaper supplies of fuels and power, more adequate and efficient transportation, more and better equipment, and a larger supply of skilled labor and of technical and managerial talent. Similarly, expansion and improvement of industry alone is not enough to assure the greater well-being and prosperity of the large farm population. Brazil's agriculture also needs better transportation and storage facilities, but above all it needs improved methods, much greater use of fertilizers, and improved implements."

Low productivity, an already fully-employed labor force, and the general acceptance of a "high-unit-profit" theory are among the inhibiting factors which led the Commission to report that economic development in Brazil must be a long-range project with very modest beginnings.

However, the biggest problem in Brazil is the financing of economic development. The Commission points out that "it will be difficult to withhold from the proceeds of exports enough foreign exchange for the purchase abroad of equipment and essential supplies, to allow rapid progress in the development programs, unless a substantial inflow of foreign capital can be attracted to Brazil. However, the greater part of the programs must be carried out with Brazilian labor and domestic materials, and should, in the main, be financed with domestic funds. Only thus can an excessive future burden on Brazil's balance of payments be avoided." Domestic borrowing, redirection of the investment of Brazilian savings, and establishment of an efficient Central Bank, are among the suggestions advanced for assuring the availability of some domestic capital.

Foreign capital is deemed vitally important to supplement the limited foreign currency available if a development program is not to be seriously retarded. Prompt action to end the lag on payments for imports is urged as one means of instilling confidence in the minds of potential foreign investors. Tax benefits would also be of considerable help in attracting investors. The Commission also forecasts that industry and mining are the areas into which very sizeable amounts of foreign capital are likely to flow if



$300 SAVED IN "PIN" MONEY

Sun Lubricant Reduces Toggle Pin Wear 70% and Minimizes Shutdowns in Die-Casting Plant

In injection-molding zinc die castings, a manufacturer was experiencing excessive wear and breakage in toggle pins. The lubricant in use, which was applied to the pins by gun, just couldn't stand up under heavy-duty operation.

Asked for his advice, a Sun engineer recommended a grease which had been "Job Proved" in many machines of the same type. Over a period of 14 months, use of this Sun grease resulted in 70 percent reduction in breakage of pins. Translated into hard cash, this represented a $300 saving. In addition, costly shutdowns for pin replacement were greatly reduced.

Records like this are not unusual in plants where Sun "Job Proved" greases and oils are used. You can rely on these lubricants to help keep equipment operating steadily and safely, with minimum time-out for maintenance. For the booklet "What Makes a Good Grease," write Dept. IA5.

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"JOB PROVED" IN INDUSTRY

measures to attract such capital are carried out.

Currency difficulties, while limiting the market for U. S. industrial imports into Brazil and other Latin American countries, have not completely cut off this trade. Even those countries presently having difficulty supplying sufficient exchange to keep current on international obligations allocate some part of their exchange to imports of machinery and materials for industrial purposes. Since these funds, including dollars, are usually applied to projects in which the government has a direct interest, it seems likely that funds will continue to be made available, according to George Wythe, Chief of the American Republics Branch of the Dept. of Commerce.

A REVIEW of the Latin American situation made available to The Iron Age by Mr. Wythe indicates that Venezuela and Cuba head the list of countries in which conditions generally favor industrialization and immediate economic development because of their favorable exchange position. Mexico has a variety of industrial resources, such as petroleum, minerals, lumber and agriculture products, and offers one of the more promising fields for industrialization. Moreover, the Export-Import Bank is studying a series of loan projects with Mexico totalling $50 million which will be spent on railroads, hydro-electric development, and similar enterprises. Argentina has relatively small amounts of coal and petroleum, and is poor in mineral wealth, but has great agricultural productive capacity, and a largely European population.

Chile, Colombia and Uruguay should be considered as offering a potential market for industrial goods, but at a lower total value level than the countries already listed. All three now have, or are negotiating for dollar loans for the purpose of carrying out industrial projects. The Export-Import Bank loan to Chile for the construction of a steel mill, originally of $28 million has been increased to $48 million. Colombia has a number of projects, including hydro-electric developments, a soda ash plant, and a steel mill, the cost of which would probably be about $150 million. It is unlikely that Colombia will be able to obtain loans of this magnitude, but it is significant that the Colombians are planning industrial projects of this nature. Uruguay, primarily an agricultural country, needs efficient transportation and also needs electrical generating plants. Several plans have been studied and it seems likely that the International Bank will grant loans to Uruguay for the purpose of building power plants.

Peru, although having considerable mineral wealth, as well as agricultural and forest resources, will probably not be a field for extensive industrialization in the near future. This is partly due to geographic factors, and also to such considerations as the type of Indian population which at present comprises the largest part of Peru's population outside the capital city, Lima. The economies of the remaining countries, the Central American Republics, the Caribbean islands other than Cuba, and Bolivia and Paraguay, are restricted by their geographic size and location, as well as their lack of resources.

THE BULL OF THE WOODS BY J. R. WILLIAMS

AH! AN OASIS IN THIS AWFUL DESERT OF STEEL! AH, LITTLE PINK ROSEBUD, HOW I'VE WAITED AND WATCHED FOR THIS RAPTUROUS MOMENT!
AN' LOOK! A NATURE BOY, A WOOD NYMPH PEEPIN' AT US FROM HIS ROSE-COVERED BOWER!
GET BACK! GIVE 'EM AIR! YOU'RE FULL OF CUP GREASE AND OIL-- ONE TOUCH AND IT'LL KILL 'EM!

5-13 J.R.WILLIAMS

A TOUCH OF NATURE AND MAN

T. M. REG. U. S. PAT. OFF.
COPR. 1949 BY NEA SERVICE, INC.

WAA Leases Two Plants

Washington

• • • **Two government-owned** surplus facilities at Rockford, Ill., which manufactured special tools during World War II, have been leased by the War Assets Administration to the W. F. & John Barnes Co. and Metal Cutting Tools, Inc., a subsidiary, the wartime operators.

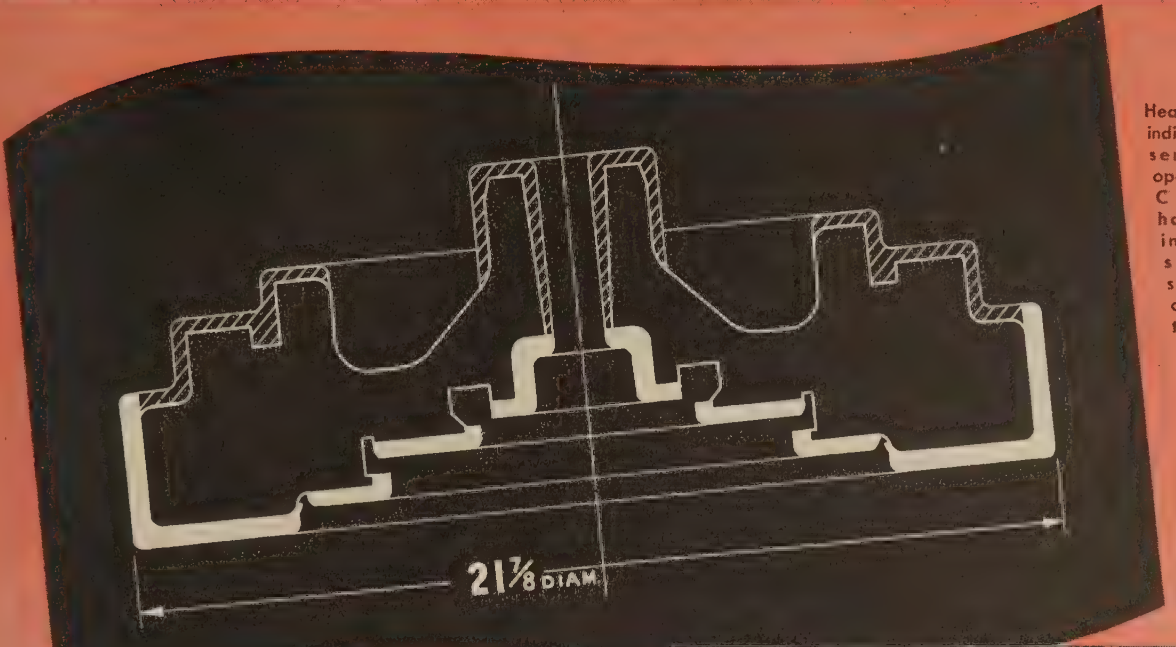
Both properties were described by WAA as a badly scrambled facility. The leases are for 10 years with options to purchase. Terms are for an annual rental of 2 pct of sales with $50,000 minimum per annum. WAA has established a fair value on the two properties at $958,950.

Files Pipeline Extension

Washington

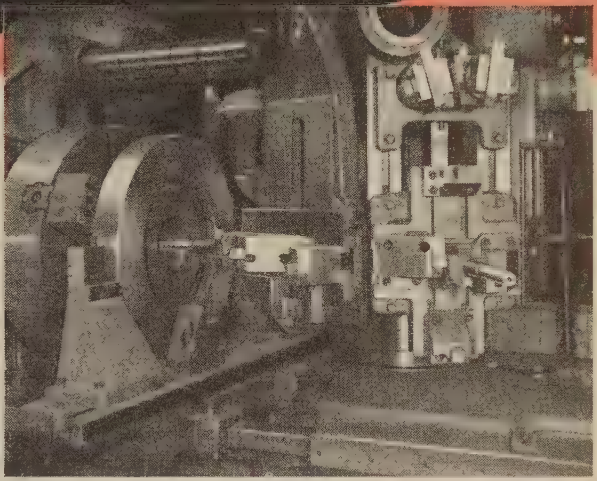
• • • **Piedmont Natural Gas Corp.** of Spartansburg, S. C., has filed an amended application with the Federal Power Commission which would extend the length of a proposed pipeline from the original 990 to 1290 miles.

Originally planned to stretch from the Gulf coast to Danville, Va., under the new program the line would diverge with one branch extending to Norfolk and the other to Richmond. Nine compressor stations, totaling 48,000 hp, would be erected.



Heavy lines indicate first series of operations. Cross-hatching indicates second series of operations.

32 OPERATIONS
ON TWO P&J AUTOMATICS IN 17.05 MINUTES WITH
P&J TOOLING



P&J tool engineers have the extensive background of experience to recommend the most economical Automatic Turret Lathe — plus the most effective tooling — for any job — especially for one that calls for a series of intricate chucking operations. Witness this heavy duty flywheel job: one operator, running two Automatics, machines the first series of operations (heavy lines in the drawing) in 17.05 minutes, and the second series (cross-hatched lines) in 12.20 minutes — delivering a finished piece every 17.05 minutes. How else would you, *could* you, do this work so efficiently? Send prints or sample parts for a P&J estimate.

1st SERIES OF OPERATIONS — HUB END TO SPINDLE

1st TF — Rough turn dia. Rough bore 2 dias. . . . Broadface bottom. Broadface dia. . . . Spade clutch face for slide tool.

2nd TF — Rough face web. Rough face open end.

3rd TF — Finish bore 2 dias. Finish face 2 surfaces . . . Finish turn. Finish broadface. Chamfer.

4th TF — Finish face web.

5th TF — Size bore 2 dias.

2nd SERIES OF OPERATIONS — FINISHED END TO SPINDLE

1st TF — Breakdown taper bore. Turn hub. Bore dia.

2nd TF — Rough face at rim. Rough face dia. Rough face hub.

3rd TF — Rough ream taper hole.

4th TF — Semi finish ream taper hole. Finish turn hub. Finish face at rim. Break corners.

5th TF — Finish ream taper hole. Finish face hub.

6th TF — Size turn hub.

Potter & Johnston Company
Pawtucket, R. I.
subsidiary of Pratt & Whitney
Division Niles-Bement-Pond Company

6 DSE AUTOMATIC TURRET LATHE

West Coast . . .

ROBERT T. REINHARDT

• Western shipbuilding appears to be poor prospect for steel consumption without a war . . . Douglas metalworking subsidiary is out of the red.

SAN FRANCISCO—Nothing short of a shooting war will revive shpibuilding on the West Coast to the point where it will be an important factor in steel consumption.

Although no one industrial spokesman will make that statement for publication, it is apparent from several interviews that prospects for shipbuilding on the West Coast are bleak in spite of conscientious efforts by organized labor and civic leaders.

Everyone concerned, from President Truman on down the line has expressed the desire to maintain shipbuilding facilities in the West and retain the skilled labor and overal knowledge developed during the war. However, this is the case of the spirit being willing but the flesh being weak. Stark economic realities involving higher costs for materials and an approximate 3 pct higher labor cost in the West as opposed to the East places this area at a marked disadvantage.

The recently organized Pacific Coast Committee for Shipbuilding for National Defense has succeeded in having a delegation of Pacific Coast congressmen discuss the situation with President Truman who in turn has passed the task of working out some practical plan for bringing more construction to this area on to John R. Steelman, his adviser. Owners and operators of shipyards in the West capable of construction of seagoing vessels see only a slight chance of such efforts proving fruitful.

Last week Daniel D. Strohmeier, vice-president, Bethlehem Steel Co., shipbuilding division, told a press conference that before shipbuilding could be redeveloped on the Coast it would first be necessary to build up Pacific Coast shipping.

Mr. Strohmeier came West to investigate several "inquiries we are trying to develop," but gave no details. He pointed out that it would definitely not be "fair to intimate that shipbuilding in this area is imminent."

Although this Bethlehem official indicated that the availability of western made steel plates was some inducement for western ship construction, he also made it quite clear that other factors were of considerably greater importance in discouraging such operations on a large scale.

He pointed out that the present 6 pct differential allowed West Coast builders on maritime construction was inadequate to overcome higher costs but refused to indicate a figure which would bring the East and West into more nearly direct competition. In touching upon the charges that Bethlehem may have discriminated against western yards in allocating some of the shipbuilding the company does have under way, Mr. Strohmeier said that none of its western facilities were adequate to care for the type of ship now being built. Bethlehem has a contract for 32 tankers, four of which have been delivered, and are being built at the Sparrows Point and Quincy, Mass. yards.

THESE were not government allocated jobs and no subsidies or differentials are allowed and then too there are no company ways large enough to handle these broad beamed vessels. He insisted that it was Bethlehem's hope that its western yards could be kept fully occupied to utilize not only physical facilities but the technically trained men they now have, but that both physical and economic factors determine where ships should be built. "Tanker buyers shop around for designs, price and delivery time, and of these, usually price is the most important," Mr. Strohmeier stated.

At least the pessimistic outlook for shipbuilding in the West is not affecting Bethlehem Pacific Coast Steel Corp.'s production. H. H. Fuller, president, reports that the combined production of furnaces at Seattle, South San Francisco and Los Angeles set an all-time high last month when they produced 62,599 net tons of steel. This is at the rate of approximately 750,000 net tons per year from facilities rated at 650,000 net tons. This April figure was an increase of 6 pct over the March output.

Metal Prices Affect Utah

Salt Lake City

• • • **Sharp decline** in the prices of nonferrous metals will reduce gross income of Utah's mining and smelting industry by about $30 million in 1949, according to estimates made by James K. Richardson, manager of the Utah Mining Assn.

A few Utah operators have cut the work week from 48 to 40 hr to reduce costs by eliminating overtime, and more curtailments are in the offing.

The price breaks were an unpleasant surprise for the industry, inasmuch as base metals have historically been among the last of the commodities to respond to price deflation.

The loss of income will hit particularly hard long-range development work which the industry badly needed because of a long period of high war production at the expense of development and exploration.

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UNITED STATES STEEL

Aircraft Manufacturer Diversifies Business

Los Angeles

• • • **"Encouraging progress"** has been reported by Douglas Aircraft for its Western Pressed Metals Div. which is headed by Harry Woodhead, ex-president of Consolidated-Vultee Aircraft Corp.

Although many aircraft companies have discussed taking on sidelines since the close of the war, Douglas is the only major West Coast company to try supplementing its decreased airframe business with another line of manufacturing. Some of the smaller companies such as Ryan at San Diego and Timm in Los Angeles have followed similar lines, however.

Even in the airframe business, increases on both commercial and military contracts have been reported by Douglas recently.

Using many aircraft techniques, such as Kirtsite dies, the Western Pressed Metals Div. is turning out auto parts, plumbing items and stainless steel. It is conducting experiments in other lines.

Although Douglas has yet to sign a major contract for the manufacture of parts for one of the large automobile assembly plants in southern California, Mr. Woodhead took an optimistic outlook when interviewed by THE IRON AGE and indicated that he expected developments along this line to materialize within the next 3 months.

Actually, the Western Pressed Metals Div. serves as an integral part of the general airframe production program of Douglas and many of the workers spend part time on aircraft problems and production and part on steel. Planning, production and tooling facilities are included.

One development about which Mr. Woodhead is being somewhat secretive is the production of stainless steel items to be shipped to an eastern company. Heavy equipment and certain dies put Douglas in an advantageous position in this market.

Western Pressed Metals has been breaking even financially for many months now, though it still is in its infancy. It is turning out hundreds of fenders, guards and other parts for California Auto Parts Co. In the home building line the company stamps out sinks, tubs, lawn tables and similar pieces. Earlier handicaps of limited steel allotments now are things of the past.

In its primary line of aircraft production, Douglas has announced accelerating DC-6 production. Many of the ships are designated for sales to such companies as Philippine Air Lines, Panagra & Delta Air Lines and Holland.

In a report to stockholders, Donald W. Douglas said that sales prospects for the DC-6 and DC-6A are better than they have been for many months and that substantial other commercial business is looming for the parent plant. First of the two Super DC-3 prototypes is expected to be ready for flight testing by the Air Force and Navy in June. Douglas hopes that the new version of the workhorse of the sky will become popular with both the military and commercial lines. A similar DC-4, modernization program offering pressurization and 260 mile speed at 17,000 ft has been submitted to interested operators.

For the first 3 months of its 1949 fiscal year ending Feb. 28, Douglas Aircraft reported a net income of $2,001,529 as compared with $24,862 for the same time last year.

In a sober mood, Mr. Douglas warned that "uncertainties inherent in the aircraft industry preclude use of first quarter earnings as a reliable yardstick for measuring the rate of return for a full year."

Operates Blast Furnace On Curtailed Basis

Salt Lake City

• • • **Kaiser-Frazer** Parts Corp., which announced last week that its Ironton, Utah, blast furnace will be placed in standby condition about the middle of May, has been operating the furnace on a curtailed basis for the past several weeks and the shutdown has been rumored for some time. Reason given by the company for the action was "a slackening demand for pig iron throughout the country."

Several factors undoubtedly contributed to the decision to discontinue production. One was the wide spread between scrap at less than $25 per ton and pig iron at $47.50 (Geneva Steel Co.'s price is $46.50). Another was the fact that the Ironton furnace had no byproduct coke ovens and had to operate on coke produced in beehive ovens.

The furnace, moved from Joliet, Ill., to Ironton early in the war to bolster West Coast pig iron supplies, barely got into production before the modern Geneva plant was completed. It was closed down in favor of Geneva's facilities and remained idle until the Kaiser interests purchased it from the government early in 1948. It was blown in May 17, 1948, and achieved a top production of around 800 tons per day. Initially its iron was shipped east to suppliers of the Kaiser-Frazer automobile plant. During the winter, production was cut to around 300 tons per day and the pig was offered in the western market. About 200 men have been employed.

Geneva's Ironton blast furnace is still operating at a capacity rate of about 600 tons a day, its output being taken by Columbia Steel Co., Pacific States Cast Iron Pipe Co. and various western foundries. Incidentally, the 25th anniversary of the furnace was officially observed during the week of May 6.

•

Alaska Attracts Migrants

Seattle

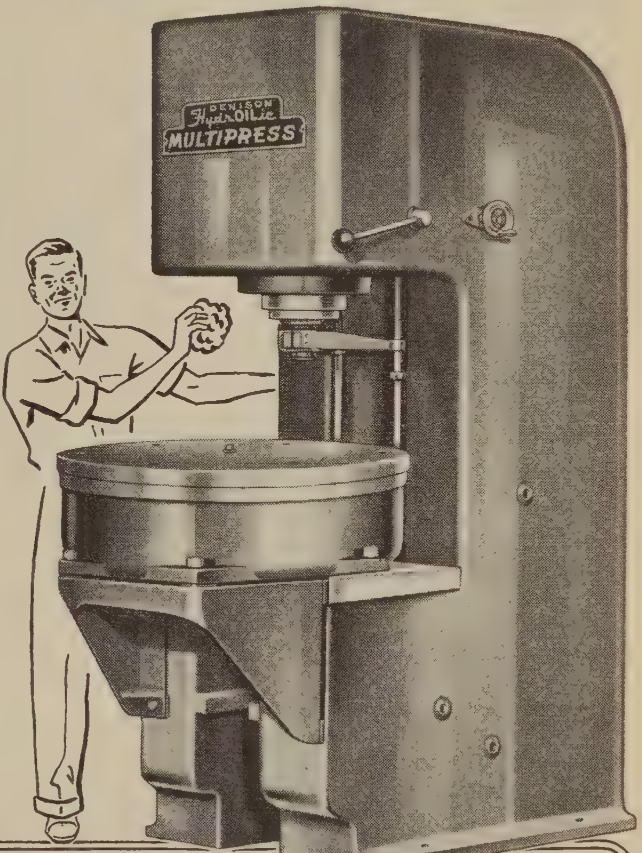
• • • **Whether it** is the lure of far places or a general national increase in unemployment isn't known, but the heavy influx of job seekers into Alaska this spring has made it necessary for the Alaska Territorial Employment Service to warn hopeful migrants that it is unwise to go into the territory without definite job-prospects.

The service reports that the labor market in Alaska is severely crowded and that even many high skilled men are unemployed in such areas as Anchorage and Fairbanks. Little change in the employment situation is anticipated before the middle of this year.

Good News

for your BIGGER JOBS!

25-ton MULTIPRESS* brings all the cost-cutting, production-boosting features of the famous bench-size models.



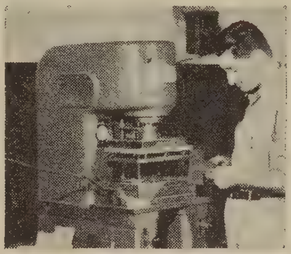
Now you can get *twenty-five tons* of the fast, oil-smooth production efficiency that has made the smaller, bench-size MULTIPRESS family so popular in industry. Its "feather touch" controls and quick, accurate, wide-range adjustability are ready to bring a full measure of cost-cutting, work-speeding MULTIPRESS action to your bigger jobs.

HIGHER PRODUCTION! Because you preset the stroke length, approach speed, pressing speed and pressure of the MULTIPRESS ram to the precise needs of each task, you get maximum operating efficiency—no waste motion. And the MULTIPRESS is *fast;* its ram delivers *controlled* power at speeds up to 530 ipm.

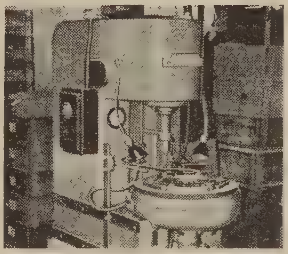
SAFE, EASY OPERATION! Easy-working hydraulic controls, operating at preset pressure limits through safe, dual hand levers, make this 25-ton MULTIPRESS simple to operate. Unskilled operators turn out production quality parts at full speed, right from the start. Adding the MULTIPRESS Index Table, or other feed devices, makes the job automatic!

Wherever you need up to 25-tons of speedy precision on jobs that call for 25-ton pressure application, you'll want to weigh the *many* proved advantages of MULTIPRESS. Write today for the full story!

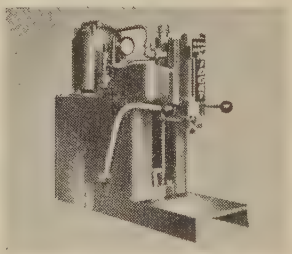
SERRATIONS are broached on small cams with this 4-ton Multipress. Parts are fed to the Multipress ram by the index table—a Multipress accessory—and pushed through cutting dies under the ram. This operator broaches 1600 cams per hour.



This 6-ton MULTIPRESS, equipped with electrically heated platens, performs a drawing operation on camera cases, and eliminates the need for presoaking the leather. Production rate is 18 to 20 cases per minute with a two-cavity die, manually operated.



Flash is trimmed from pipe plugs on this 8-ton Multipress with HydrOILic index table. On the kick press used before 6,000 blanks were trimmed in a day. Now, the Multipress operators produce 19,000 blanks a day.



The Multipress Midget—a one-ton high-speed, oil-smooth, hydraulic production tool—is ideal for small-parts work. Dual "feather touch" controls minimize fatigue, increase safety, speed production and improve quality.

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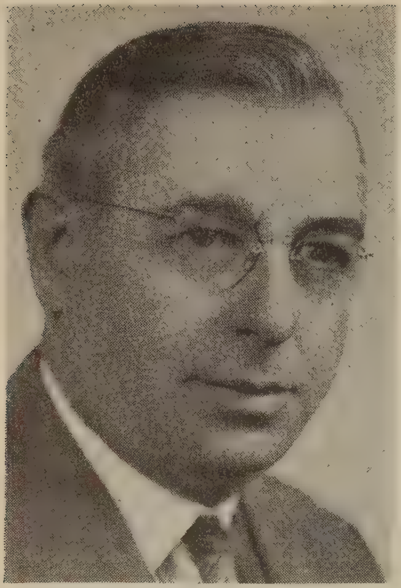

FRANK R. S. KAPLAN, president, Copperweld Steel Co.

• **Frank R. S. Kaplan,** first vice-president, who has been acting president of Copperweld Steel Co., Pittsburgh (see THE IRON AGE, Apr. 7, page 124), since the recent death of S. Eugene Bramer, has been elected president of the company.

• **Russell C. Jones,** president of the Griscom-Russell Co., New York, since 1939, has retired but continues to act as director. Mr. Jones has been associated with the company for 40 years. **Kenneth B. Ris,** formerly vice-president in charge of sales, has been appointed to succeed Mr. Jones as president. **Charles D. Steffens,** who has been sales manager, has been elected vice-president, sales and **James W. Elizardi** has been named vice-president, petroleum sales. Mr. Ris joined the company in 1922. Mr. Steffens has been with Griscom-Russell since 1925. Mr. Elizardi joined the company in 1928.

• **C. B. Momberger** has joined the sales force of Universal Steel Co., Cleveland. Mr. Momberger had been in the sales organization of Bethlehem Steel Co., Inc. for the past 11 years and prior to that had been associated with Otis Steel Co.

• **Donald P. Gordon** has been appointed resident salesman in the Buffalo office, Berger Mfg. Div., Republic Steel Corp., Cleveland. Mr. Gordon has his headquarters in Utica.

• **Norman A. Kelsey** has been appointed New York district sales manager, Central Iron & Steel Co., Harrisburg, a subsidiary of Barium Steel Corp. Mr. Kelsey had formerly served as New England district sales manager. **Charles J. Sisto,** formerly representative for Erie Bolt & Nut Co., has been appointed district representative in New Jersey. **William H. Spooner,** formerly New York district sales manager and prior to that time New England district sales manager, has returned to Boston as New England district sales manager. **Walter A. Hill,** formerly Philadelphia district sales manager, has resigned and has been succeeded by **John L. Noll. Kenneth M. Rhoads,** formerly district representative in central Pennsylvania operating out of the general office, has resigned. **Robert M. Schein,** formerly New Jersey representative in the New York office, succeeds Mr. Rhoads. **William N. Lowe,** formerly specialty parts representative out of the general office, has also resigned. **Robert N. Moffett,** who for the past 12 years has been associated with Lukens Steel Co., has joined Central Iron & Steel as a sales engineer with headquarters in Harrisburg, Pa.

• **A. W. Simpson III** has been elected president and treasurer, and **F. K. Kartenstein,** vice-president and secretary, Western Die Casting Co., San Francisco.

• **H. P. Rees** has been named general superintendent of the newly-combined Farrell and Lowellville plants of Sharon Steel Corp., Sharon, Pa. Mr. Rees has served as general works manager for the past 12 years. **William J. McGaffney** has been appointed assistant general superintendent. Mr. McGaffney has for the last two years been assistant general works manager at the Lowell plant. **J. T. Bachman,** assistant operating vice-president for the past 4 years, has been transferred to the sales department of the company. **F. B. Quigley,** general superintendent of the Farrell Works, has been appointed consultant to the operating management.

JACK W. CRAWFORD, manager, distributor sales division, Firth Sterling Steel & Carbide Corp.

• **Jack W. Crawford** has been appointed manager of the newly-created distributor sales division of Firth Sterling Steel & Carbide Corp., McKeesport, Pa. Mr. Crawford had previously served as factory sales manager for Firestone Tire & Rubber Co., Akron.

• **Edward C. Ford** has been appointed assistant secretary of Jones & Laughlin Steel Corp., Pittsburgh and of most of its subsidiaries. He has been an attorney in the legal department of the company since early in 1948 and now continues in that capacity in addition to assuming the duties of assistant secretary.

• **Joseph G. Keller** has been appointed assistant district industrial engineer of the Youngstown steel plant of Republic Steel Corp., Cleveland. Mr. Keller joined Republic 12 years ago as a weigher in the electric weld tube mills, later serving as a production clerk in the tube mill accounting department and then as work-simplification engineer and methods engineer.

• **L. W. Graaskamp,** general manager of sales, has been named vice-president in charge of sales, American Can Co., New York, succeeding W. C. Stolk, who has been made executive vice-president of the company. Mr. Graaskamp directs all sales activities in the United States, Canada and Hawaii. He has been associated with the company 30 years and continues his headquarters in New York.

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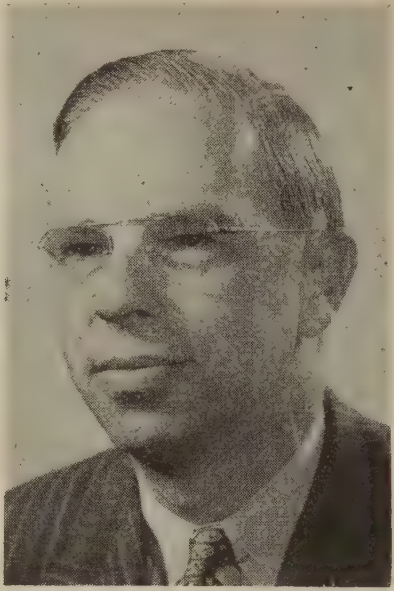
FRANK H. FANNING, vice-president, Armco Steel Corp.

• **William H. Mitchell** has been elected a director of Armco Steel Corp., Middletown, Ohio. **Frank H. Fanning** has been named vice-president in charge of operations. Mr. Mitchell is president of Mitchell Steel Co., Cincinnati. Mr. Fanning has been with Armco since 1909. He has served as assistant vice-president since 1938. Mr. Fanning succeeds F. E. Vigor, who died. **L. F. Reinartz,** formerly manager of the Middletown division, and **R. S. Gruver,** formerly manager of the Ashland division and more recently administrative assistant, operating division at Middletown, have been named assistant vice-presidents. **C. G. Davies,** who has been assistant to the vice-president since 1943, has been named administrative assistant, operations division.

• **Jack N. Yetter** has been appointed district sales engineer in charge of the Tulsa, Okla., office of Twin Disc Clutch Co., Racine, Wis., and **Harry T. Peck** has been promoted from installation engineer to district sales engineer, operating out of the Dallas office. Mr. Yetter had formerly been associated with Link-Belt Co. Mr. Peck had been with Gifford Hill & Co.

• **William B. Crump** has joined the sales organization of Chicago-Latrobe, Chicago, as district manager in the Michigan industrial territory, with his headquarters in Detroit.



HERBERT D. RATHBUN, secretary and treasurer, John A. Roebling's Sons Co.

• **Herbert D. Rathbun** has been appointed secretary and treasurer of John A. Roebling's Sons Co., Trenton, N. J., succeeding **Archibald W. Brown,** who retired after 47 years of service. Mr. Brown continues as a member of the board of directors. Mr. Rathbun has been associated with Roebling since 1938. **Clarence W. Snyder** has been made controller and assistant secretary and **H. Russell Brown,** assistant treasurer and assistant secretary. Mr. Snyder has been with the firm since 1940 and Mr. Brown joined the company in 1935.

• **J. F. O'Brien** has been appointed general sales manager and **C. A. Netter,** general purchasing agent, Vulcan Iron Works, Wilkes-Barre, Pa. Both Mr. O'Brien and Mr. Netter have been associated with the company in responsible capacities for a number of years.

• **Ernest G. Unrath,** formerly general superintendent of the Ambridge plant of the Spang Chalfant Div., National Supply Co., Pittsburgh, has been promoted to works manager of the plant. Mr. Unrath has served as plant superintendent since early this year, after serving 5 years as superintendent of the hot mill at Ambridge. He has been with Spang-Chalfant since 1931. **S. H. Kilmer,** formerly superintendent of inspection at the Ambridge plant, has been named general superintendent, succeeding Mr. Unrath.

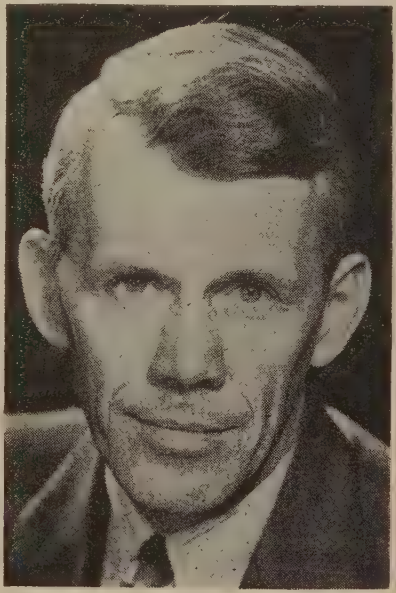
• **Ralph J. Cordiner** has been elected executive vice-president and a director of the General Electric Co., Schenectady. Mr. Cordiner has been vice-president and assistant to the president since 1945. He joined Hotpoint, Inc., a G.E. affiliate, in 1923. **Steven C. Van Voorhis** has been named manager of advertising and sales promotion for the newly-formed Michigan district of G.E.'s apparatus department. Mr. Van Voorhis has been with the company since 1947.

• **Eads Johnson, Jr.** has been appointed assistant vice-president of the Southern Wheel Div., American Brake Shoe Co., New York. Mr. Johnson has been with Brake Shoe since 1934. He has been serving as sales representative of the company's brake shoe and castings division. He has his headquarters in New York.

• **G. F. Clipsham,** assistant to the president, **William Irrgang,** director of plant engineering, and **L. K. Stringham,** director of welding development, Lincoln Electric Co., Cleveland, have been elected members of the board of directors of the company.

• **Charles E. Heywood** has been appointed service engineer for Elastic Stop Nut Corp. of America, Union, N. J. Mr. Heywood had previously been associated with the Chance Vought division of United Aircraft as standards engineer.

CHARLES E. HEYWOOD, service engineer, Elastic Stop Nut Corp.

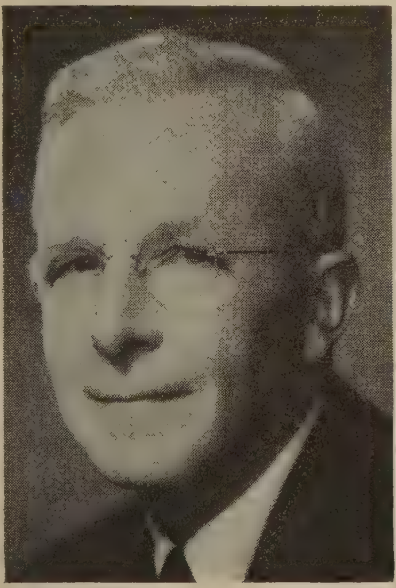


• **James W. Hepburn** has been appointed assistant manager of the vertical turbine pump division of Worthington Pump & Machinery Corp., Harrison, N. J. Mr. Hepburn has his headquarters at the corporation's Denver works, and is responsible for the sale of the division's products in the territories west of the Mississippi River, including Chicago, St. Paul and New Orleans. He has been with Worthington since 1929. Since 1945 he has served in the reciprocating pump division in Harrison.

• **K. M. Nelson** has been appointed to the post of industry specialist, Cutler-Hammer, Inc., Milwaukee. Mr. Nelson has been associated with the company's machine tool and air conditioning products for a number of years.

• **Hunter Gehlbach** has been appointed assistant general counsel, Borg-Warner Corp., Chicago. Mr. Gehlbach joined the Borg-Warner legal department in 1943.

• **H. Robinson Hyde** has been appointed production manager of the main plants of National Screw & Mfg. Co., Cleveland. **Samuel M. Washabaugh** has been named manager of sales promotion. Mr. Hyde has been assistant to the vice-president in charge of production at National and Mr. Washabaugh had served as production manager there prior to his new appointment.



SAMUEL M. WASHABAUGH, manager of sales promotion, National Screw & Mfg. Co.

CHARLES L. WOOLDRIDGE, JR., manager of sales training, U. S. Steel Corp. of Delaware.

• **Charles L. Wooldridge, Jr.** has been appointed manager of sales training, U. S. Steel Corp. of Delaware, Pittsburgh. Mr. Wooldridge joined U. S. Steel in 1946 as staff assistant to the vice-president, sales.

• **Alan Carver** has been appointed manager of the New York branch office of Standard Tool Co., Cleveland. **Joseph W. Bremer** has been named secretary-treasurer; **William S. O'Conner,** sales manager; **Elton Hoyt, III,** assistant sales manager; **Lewis D. Fykse,** manager of service engineering; **Joseph Klima,** manager of the order department; **Chester Elliott,** manager quotation department; **Chester Hemerlin,** manager inventory control; **Norman Duenk,** chief metallurgist. Mr. Lees had formerly been associated with Weldon Tool Co. Mr. Carver had formerly been connected with a large mill supply organization in New York.

• **A. W. Anderson** has resigned as vice-president after 31 years with Claud S. Gordon Co., Chicago.

• **Chester H. Sanderson** has been appointed advertising manager of Mine Safety Appliances Co., Pittsburgh. Mr. Sanderson had been employed for over 20 years in the company's direct mail, display and advertising departments.

CARL B. POLLOCK, vice-president, Allegheny Ludlum Steel Corp.

• **Carl B. Pollock,** manager of production, Allegheny Ludlum Steel Corp., Pittsburgh, has been elected vice-president in charge of production. **Emil Kern,** chief engineer, has been promoted to a newly created vice-presidency. Mr. Pollock has been in the steel industry since 1916 and has been with Allegheny Ludlum since 1932. He succeeds M. C. Harris, who has resigned. Mr. Kern joined the company in 1946 and had previously been connected with Mesta Machine Co. and Reynolds Metals Co.

• **Mark A. Loofbourrow** has been elected to the board of directors of Harris-Seybold Co., Cleveland, succeeding **J. W. Valiant,** who died. Mr. Loofbourrow is also a director of West Virginia-Pittsburgh Coal Co. and Carey Machine Co.

• **Harrison Taylor** has been appointed sales engineer in the New York district office of the Whiting Corp., Harvey, Ill., succeeding **Allen R. Binckes,** who has recently been transferred to Los Angeles as district sales manager for the Pacific Coast area. Since 1938, Mr. Harvey has been in the employ of Whiting at its main office and plant in Harvey, both as an engineer and estimator in the railroad products department.

A. J. FITZGERALD, general manager, Cleveland Punch & Shear Works Co.

• **A. J. Fitzgerald,** who has served continuously for the past 30 years with the Cleveland Punch & Shear Works Co., Cleveland, has been appointed general manager. Mr. Fitzgerald is succeeded by **A. W. Schultz** as sales manager. Mr. Schultz had previously served in the sales department.

• **John W. Humphrey,** formerly executive vice-president of the Philip Carey Mfg. Co., Cincinnati, has been elected president of the company, succeeding **Robert S. King,** who became chairman of the board, succeeding **George A. Rentschler,** who continues as chairman of the executive committee. Mr. Humphrey has been with Carey since 1948 and had formerly been associated with General Motors, National Cash Register and International Telephone & Telegraph Corp. **L. W. Clarke,** formerly general sales manager of Carey, has been elected vice-president in charge of sales, succeeding **E. W. Smith,** who has resigned. Mr. Clarke has been with the organization since 1935.

• **Victor Ladetto** has been appointed sales manager and **Donald H. Sleeper,** assistant sales manager, Continental Screw Co., New Bedford, Mass. Mr. Ladetto has been with the company for 25 years and for the past ten years has been assistant to the vice-president. Mr. Sleeper has been with the company about 14 years.

JOHN P. DeHETRE, manager, oil country tubular sales, Youngstown Sheet & Tube Co.

• **John P. DeHetre,** development engineer, has been appointed manager oil country tubular sales, Youngstown Sheet & Tube Co., Youngstown, succeeding Jay W. Owings, who has been made an assistant general manager of sales. **Robert E. Hawley** has been named assistant manager of oil country tubular sales. **Paul B. Baird** has been named assistant manager of standard pipe sales. Mr. DeHetre joined the company as an assistant field engineer in Los Angeles in 1938. Mr. Hawley joined the company in 1936 as assistant consulting engineer in the water works division of pipe sales. Mr. Baird joined the company as clerk in the rod and wire shipping department in 1925. **Kenneth J. Holme** has been promoted from assistant superintendent of rolling mills to superintendent of hot strip and tin mills at the Indiana Harbor Works. He has been succeeded by his brother, Ernest Holme, formerly roller in the bar and billet mills. Kenneth Holme has been associated with the rolling mills at Harbor Works for more than 25 years. Since 1942 he has been assistant superintendent of the department, which post he held until his recent appointment to the tin mill position. Ernest Holme joined the company as a weighmaster on the skelp mill and has been a roller in the bar and billet mills since 1933. **C. L. Lindholm** has been appointed assistant superintendent, roll department at the Harbor Works. Mr. Lindholm had formerly been assistant to superintendent, Gary Works, Carnegie-Illinois Steel Corp.

• **John L. Wilson, Jr.** has been appointed Pittsburgh engineer-representative of Selas Corp. of America, Philadelphia. Mr. Wilson had previously served as a combustion engineer with Armco Steel Corp.

• **W. R. Toeplitz** and **Samuel S. Connor** have been elected members of the board of directors of Bound Brook Oil-Less Bearing Co., Bound Brook, N. J.

OBITUARY...

• **C. Neal Barney,** 73, vice-president, secretary and general counsel, Worthington Pump & Machinery Corp., New York, died April 24.

• **George D. Blair, Jr.,** 61, president, Blair Strip Steel Co., New Castle, Pa., died May 4.

• **William T. Mossman,** 76, retired director of advertising, Jones & Laughlin Steel Corp., Pittsburgh, died May 5. Mr. Mossman served J&L 40 years, principally dealing with the press and guiding the company's public relations.

• **Eben J. Fullam,** 78, chairman of the board, Fellows Gear Shaper Co., Springfield, Vt., died April 26.

• **John L. Chisnall,** 64, ballistics engineer, Remington Arms Co., Bridgeport, Conn., died recently.

• **Gilbert Cohn,** 43, partner in the firm of Morris & Cohn, Inc., Chicago, died April 30.

• **Ernest H. Korte,** 64, retired purchasing agent, Lunkenheimer Co., Cincinnati, died recently.

• **William G. Starkweather,** 79, president, Starkweather Engineering Co., Newtonville, Mass., died April 23.

This "Iron Horse" Has 38,636 Fasteners

It takes 38,636 tough, accurate fasteners of high tensile strength — to match the stress and strain on the framing members of a diesel pulling heavy freight loads.

More than 2,300 bolts . . . 13,800 nuts . . . 21,700 screws . . . 800 rivets furnish the forces that hold modern 4 unit diesel assemblies together.

Because these fasteners have such a vital responsibility, top quality is essential. That's why Russell, Burdsall & Ward for over a century has carried on continuous and intensive research and development work, and has invested consistently in large expansion and improvement programs.

With the price of fasteners such a small part of the total production cost, you'll find it doesn't pay to take chances with fastener quality. For it isn't the initial price but the cost of *using* fasteners that counts.

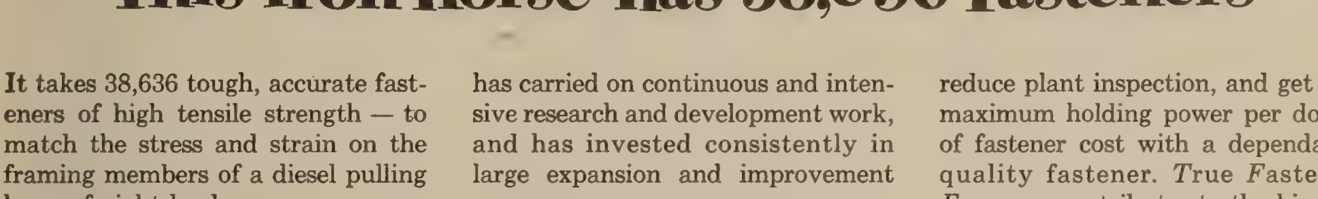
To attain True Fastener Economy —save assembly time, eliminate or reduce plant inspection, and get the maximum holding power per dollar of fastener cost with a dependable quality fastener. *T*rue *F*astener *E*conomy contributes to the kind of production savings that puts more and more diesels on U. S. tracks every year. It is this type of contribution to major American industries that explains why — for over 104 years — RB&W has been *making strong the things that make America strong.*

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

RB&W

Plants at: Port Chester, N.Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Chattanooga, Oakland, Portland, Seattle. Distributors from coast to coast.

38,636 Fasteners are used in 1 American diesel locomotive



104 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

European Letter . . .

• British economy faces more rigidity . . . High government expenditure rate precludes concessions from wartime taxation levels . . . Somewhat disadvantageous, sterling devaluation must be considered in growing price and cost divergencies.

LONDON — Sir Stafford Cripps, questioned at his press conference in Rome about the prospect of a devaluation of sterling, gave an emphatic answer. Whatever might happen to other currencies, he said, a devaluation of sterling was "neither necessary nor would it take place." It is true that Ministers of Finance have to give this answer, and carry as much conviction as they can, up to the moment of signing the order for a devaluation. It is a waste of breath for press correspondents to ask a question to which they know they can only get one answer. It is true also that, for all Sir Stafford's reputation for political honesty, the case of industrial assurance has shown his promises to be no better than any other politician's. An assurance from Sir Stafford that such-and-such a thing will not happen is not necessarily to be taken as proof that it will not happen, or even that he will not himself cause it to happen. But in his declaration to the journalists of Rome there was a ring of finality, an overtone of moral fervor. This time, Sir Stafford really means what he says — at least for the time being.

An attitude of determined opposition to all thought of devaluation is not necessarily wrong. There would be grave disadvantages in devaluation. In fact, there is no present case at all for devaluation, and the most that anybody can say is that there may be a case for it before very long. But a policy of clinging to the present exchange value of sterling has certain corollaries which those who believe in it will have to face. It is becoming clearer every day that there is a great and growing divergence between the level of costs and prices in the sterling and dollar areas. The results of an inquiry by the Trinidad Chamber of Commerce into the prices of certain consumer goods as landed in that island from the United Kingdom as compared with the same or similar goods from the United States or Canada, in general shows a very decided price advantage in favor of the North American products. British electrical goods, for example, the sort of thing on which so much reliance is placed in the export drive, are stated to be on the average 100 pct dearer than the American or Canadian articles. Other similar evidence is coming in daily from all over the world.

This is a very serious situation for a country whose whole future is staked on its ability to export. It is clear that with price discrepancies of this order, widening as American prices fall, it will be difficult to hold British sales in the dollar area itself, and that the increases talked of in the long-term plan are out of the question. Nor is it only in the dollar area that high prices will soon be endangering British exports. Other European manufacturers will be able to cut their prices as the seller's market wanes and the buyer's market waxes. The discipline of the sterling area will not be sufficient to force reluctant customers to pay high prices for British goods when much cheaper and often better American goods are being offered by American firms growing ever more hungry for markets.

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BRITISH exports have been at a high level in recent months. But it will not be possible to keep them there with the present costs and prices. Yet kept there they must be, for exports, and particularly dollar-earning exports, are at the very foundation of the government's plan for attaining national solvency and self-respect by 1952. If exports do not go on rising, then either imports will have to be cut below the safety level, or else the country will slither helplessly back into Daltonian insolvency.

Sir Stafford Cripps must know all this perfectly well. When, therefore, he nails his flag to the mast, he must be supposed to have some plan in mind by which British prices can be made competitive in the markets that must be held. And if that plan does not envisage a reduction by way of devaluation, it must involve a reduction in the level of sterling costs here at home. It would be interesting to know how Sir Stafford proposes to achieve this. But whatever his plan, it is evident that he cannot look for any assistance to the trade union movement. In a stormy meeting, the General Council of the Trades Union Congress was, by all accounts, only with difficulty restrained from declaring open war on the Chancellor for his Budget. As it was, the TUC delivered an ultimatum—either the cost of living must go down or wages must go up.

IT IS evident from this that the trade unions consider they have a prescriptive right, under a Labor government, for some benefit for their members every year, come hell or high water. The total of wages in 1948, as compared with 1947, rose by a larger proportion than the whole national income. In the latest twelve-month period for which there are figures, the index of wage rates rose by 4 points, and

Designing for Sales

Nickeloid Metals Provide Both a New Material and a New Production Method

CARL C. STRUEVER
Gen. Mgr., American Nickeloid Company,
Peru 2, Illinois

NICKELOID METALS provide two important sales advantages: First, lower unit costs; second, greater product beauty. They offer both a material and a production short-cut method of interest to every designer, every production and sales executive.

GREATER ECONOMY

NICKELOID METALS are *pre-finished* metals produced in sheets or coils and therefore more economical to use. No further plating, polishing or other finishing is required. The manufacturer need only fabricate to form a finished part or product. For normal production, NICKELOID METALS can be blanked, formed, drawn, stamped, bent, soldered, riveted or spot welded, without damage to the fine finishes. And for severe fabricating conditions the metal can be further provided with a "Mar-Not" protective coating — either a pressure sensitive paper, or a stripping type plastic film, either of which readily peels off after fabrication.

WIDE RANGE OF METALS

NICKELOID METALS are electroplated coatings of copper, brass, nickel or chromium on base metals such as zinc, steel, copper, brass or aluminum. Each NICKELOID METAL therefore is a combination that provides desirable properties such as surface beauty, rigidity, heat-resistance and other qualities. A full range of gauges and tempers allows for almost endless applications of decorative and functional use.

FULL DESIGN RANGE

With so much variety in finishes, basic metals, patterns and tempers — NICKELOID METALS provide endless opportunities for creative design. The interesting patterns can keynote a product design, or blend perfectly with an overall design, both for trim and utility. Designers will find in these metals inspiration for lending an added touch of beauty to any product.

APPLICATIONS ARE BROAD

Wherever bright, lustrous metal is desirable, and it almost *always* is, NICKELOID METALS can be considered. They are widely used in packaging, hardware, trim, stampings, housewares, signs, appliances, novelties.

LATEST STUDIES AVAILABLE

Available on request are late, complete studies on the properties, applications and latest fabrication techniques for NICKELOID pre-plated METALS, including metal samples. Manufacturers are invited to write for these complete studies as an aid to designing for lower production costs and increased salability.

AMERICAN *Nickeloid* COMPANY— Peru 2, Illinois the index of the cost of living by 3. This was a period in which the wage-earner has been given the benefits of extended national insurance, of which his contribution covers a bare third of the cost, and of the national health service, most of the cost of which falls on the general taxpayer. The few pennies a week that the limitation of subsidies will cost the average family do not alter the fact that the average wage-earner is better off this year than he was last. The TUC is not, therefore, defending a threatened standard of living; it is the economic aggressor, seeking Danegeld, a bit more than last year, or there will be trouble. It is clear that so far as the level of costs in British industry is concerned, it is more likely to rise than to fall. Thus in all its joints and members, the British economy is being made ever more rigid. The rate of government expenditure is so high that no concession from wartime levels of taxation is possible now or in the foreseeable future. Heaven alone knows how a third war could be financed. Manpower must neither be compelled by direction to move from one industry to another nor induced to do so by the emergence of any unemployment or even by a fall in wages in unprofitable industries. Wages may go up, but must never come down, either in money or in real terms. The rate of interest is untouchable. The rate of exchange is sacrosanct. Any one of these rigidities could possibly be justified if it were considered by itself. Combined, they simply do not make sense. Even a community that lived in complete self-sufficient isolation from the world would slowly ossify if it denied itself all the elasticities. In the world as it is, a wholly rigid economy is likely to meet trouble much more quickly. Like some of the hastily-built merchant ships of wartime, all the stresses and strains have been welded into the frame. In a smooth sea, the ship is impressive; but it will break up in the first storm.

The Labor Party, apparently, does not believe in storms. If there are strains and stresses in the economic framework, then the hull must be stretched by sheer brute force of controls and welded together by Acts of Parliament. Sir Stafford Cripps has stretched it to the maximum. He has performed more miracles in making the unworkable work than would have been believed possible. But it cannot go on forever at full stretch. Something must be relaxed somewhere, or something will give way somewhere. The government's long-term plan showed that the present set of expedients, they are too mutually contradictory to be called policies, will hang together when Marshall Aid is withdrawn only on the assumption that exports are then even higher than they are now. The assumption may not yet be a wholly impossible one, but it begins to look very rash indeed. What is quite certain is that a system of conflicting rigidities will not work in 1962 on any assumption. The leaders of the Labor Party ought to be trying to make up their minds which of their fetishes they will abandon in order to have a chance of keeping the rest.

Expects Continued Capacity Operations For Canadian Steel

Toronto

• • • **Addressing shareholders** of the Steel Co. of Canada Ltd., H. G. Hilton, president, outlined the iron and steel situation as pertaining to his company, which also summarizes the entire Canadian steel situation. Mr. Hilton stated that sales of his company continue to expand, and those for the first 3 months this year again were a record high in the history of the company.

Production of cold-rolled steel sheets and tin plate from the new mills, which commenced to operate at the close of last year, is increasing, he said, and has contributed to the greater sales volume of the current year. Several new departmental production records have been achieved and all major departments are operating at maximum capacity.

Capacity operations throughout the current year are expected to continue. "The relationship between the supply of steel and the demand has been widely discussed," he said, "and there has been criticism of the seeming failure of the steel industry to make the necessary capital expansion to furnish all buyers immediately with as much steel as has been desired. The record demands from all classes of consumers, which have prevailed since the end of the war, result from deferred needs which have been accumulating for many years. As a result, a condition unique in the annals of the steel industry has been created.

"**Ordinarily,** when some classes of steel consumers are enjoying active business, others are not so fortunate, and the total demand is the result of an average condition of activity. On the contrary, during the past 3 years, customers of every class have been able to consume or distribute steel at their full capacity. Consequently the aggregate requirements have been of a most unusual volume. There are now increasing indications that supply and demand are coming into balance, partly because of the high rate of world steel production and partly due to the fact that certain needs have been satisfied.

"The rate of ingot production in the United States and Canada during the first quarter of this year has continued at an all time record level. In the United Kingdom, Belgium, France and Luxemburg, monthly production figures are well above the average for the year 1937, while at the same time German output has been rising more rapidly than was expected.

"In the United States many steel lines now are readily available, and it is expected conditions gradually will assume more normal proportions. In Canada, while backlog of orders for some finished steel goods has declined, the demand for primary hot and cold-rolled products is still insistent. If there should be any decline in demand for these products, imports would probably be affected first because of their higher delivered costs. It therefore appears reasonable to expect that production will continue at current rates, at least until the latter part of this year."

"King Size" Power-Shovel Bucket made of **J&L HEAT-TREATED JALLOY STEEL** still going strong after full year's gruelling service!

J&L STEEL

Performance record on this
Marion No. 5561 power shovel
proves high-impact and
abrasion resistance of
J&L heat-treated JALLOY

—40 CUBIC YARDS

of earth and rock in one "scoopful." This monstrous power-shovel bucket excavates 10 acres to a depth of 50 feet *in a month.*

Working *day and night* it removes overburden on a large strip mining operation in southern Illinois. As it digs its way through some 15 feet of limestone, 15 feet of shale and 20 feet of clay, it is subjected *continuously* to severe abrasion and impact.

Yet the J&L *heat-treated* JALLOY STEEL on the bucket *has given more than a year of service!*

To date more than 6,000,000 cu. yds. have been excavated, but the excellent appearance of the J&L heat-treated JALLOY STEEL indicates a reasonable expectancy of *many more* months of service before replacement is necessary.

J&L *heat-treated* JALLOY STEEL was developed for just such uses as this—where steel must withstand extreme abrasion and heavy shock for long periods of time. Its outstanding wear-resistant properties make it especially useful for Scrapers . . . Rock crushers . . . Bulldozers . . . Truck bodies . . . Dump cars . . . Chutes . . . Power-shovel buckets.

Wherever wear and abrasion are limiting factors in the life of equipment, you'll find it profitable to use J&L *heat-treated* JALLOY STEEL. May we send you the booklet mentioned in the coupon?

JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in OTISCOLOY *and* JALLOY *(hi-tensile steels).*

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

Jones & Laughlin Steel Corporation
403 Jones & Laughlin Building
Pittsburgh 30, Pa.

☐ Please send me your booklet: "JALLOY—J&L ALLOY STEEL."

☐ Do you recommend Jalloy for: ________________

NAME________________

COMPANY________________

ADDRESS________________

• **GOOD AND BAD**—Freight car deliveries during April totalled 10,587, according to American Railway Car Institute. March deliveries were 11,910. Only 30 new cars were ordered during April. Backlogs as of May 1 totalled 62,569, compared with 134,676 a year ago. April marks the last month in which we are likely to reach the 10,000 car goal and several car building plants are closing down because their order books are exhausted, according to S. M. Felton, president of the Institute.

• **ARMS IMPACT**—Foreign and domestic security programs will require slightly more than 6 pct of estimated U. S. Steel supply, National Security Resources Board estimated this week. Other requirements are: Aluminum, 6 pct and copper, more than 15 pct. Foreign aid alone will need less than 2 pct of steel, less than ¼ pct of aluminum and over 4 pct of copper. Military aid will amount to less than ½ pct of total supply of all three metals.

• **RESUMPTION**—Apex Electrical Manufacturing Co. plans to resume full-scale production operations sometime in May, according to C. G. Frantz, president. Plans are based on present sales (March increased over January and February) and expectation that inventories of finished goods will have reached "normal levels" by that time.

• **BUYS PLANT**—Chevrolet Motor Div. has purchased a government-built plant at Saginaw, Mich. for $1,300,000. Plant was used to produce aluminum aircraft forgings during World War II, can be repossessed in event of national emergency.

• **EXPORTS EASED**—Commerce Dept. this week lifted export control quota restrictions on another long list of iron and steel products. Office of International Trade explained action was taken because of improved domestic situation and exporters must still obtain licenses.

• **PIG IRON DOWN**—Republic Steel Corp. shaved pig iron prices at Birmingham $4 per ton, effective May 6. Republic's reduction now puts their prices in line with Woodward Iron Co. and Sloss-Sheffield Steel & Iron Co.

• **FASTENERS DOWN**—Parker-Kalon Corp., New York, has reduced prices on all types of screws used for metal and wood fastening. Reduction, about 11 pct, covers both bulk and package quantities, restores prices existing in 1947.

• **SILICON DIFFERENTIAL**—The differential for silicon content in blast furnace silvery iron has been dropped to $1.00 per half point of silicon by Hanna Furnace Co. The former differential was $1.25 per half point.

• **NOT ALARMED**—The 3 pct drop in wholesale-retail sales for the first quarter is not viewed with alarm by the Office of Businss Economics but is seen as a more cautious spending policy. The drop in personal income is largely agricultural and seasonal; more of disposable income is going into savings against lower prices while business inventories are being held down.

• **GAINS LEAD**—Chevrolet has passed Ford as the leading producer of automotive vehicles, even though its plants were forced to close during January for a model changeover. Margin is expected to lengthen as Ford lines are shut down by strike. For first 4 months Chevrolet's output was 433,780, compared with 406,115 during same period last year.

• **PAYROLL TOPS**—March payroll of the iron and steel industry is estimated at $207,152,000 by American Iron and Steel Institute. This is an all time high. Of the total, wage earners received $167,883,000. Estimated total employment was 651,700, including 555,200 wage earners.

• **REVISE EXTRAS**—Inland Steel on May 6 announced that their sheet extra card dated Mar. 21, 1949, would not be effective after May 9. The cancelled extras covered increases in certain specialized operations. Such charges will automatically revert to the original card in force prior to Mar. 21, 1949.

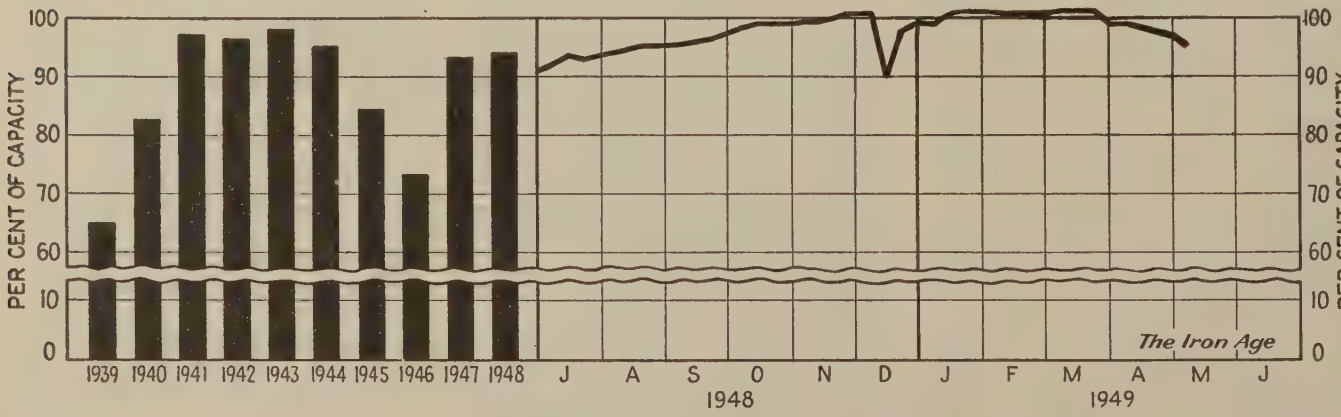
• **SILVERY IRON**—Effective May 1, Keokuk Electro-Metals Co. has reduced the price of electric furnace silvery iron, 14.01 to 14.50 pct silicon, openhearth and foundry grade, to $80.00 per gross ton, f.o.b. Keokuk, Iowa or Wenatchee, Wash.

• **WORMS DOWN**—On May 3, Winfield H. Smith Corp., Springville, N. Y., reduced prices on all models and sizes of worm gears, differential and helical speed reducers. Manufacturing improvements and marketing economies were cited for making cuts possible.

• **COMPETITION**—Latest move in the competitive refrigerator field came last week when General Electric Co. cut prices on two 6 cu ft boxes $17 and $15, respectively. Dealer orders for this seasonal product increased sharply during April.

• **SLASHES PRICES**—Rockwood Manufacturig Co., Inc., Indianapolis, reports that they have cut prices on all V-belt sheaves and paper pulleys, effective May 1. Reductions range from 12 to 25 pct.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
May 3	98.0	101.0	94.0	98.0	99.0	104.0	100.0	102.0	95.0*	97.0	100.0	75.5	64.0	97.5
May 10	96.0	100.0	92.0	98.0	104.0	104.0	98.5	103.0	75.0	102.5	93.0	75.5	64.6	96.0

* Revised.

Industrial News Summary

- ***Current Steel Orders Good***
- ***Uncertainty To Come Later***
- ***Steel Rate Down To 96 Pct***

THE steel industry this week is settling down into a normal pattern with gusto. The consumer is in the driver's seat but he is not nasty—yet. Most mills are comfortably fixed for business through July at least.

If there are ominous signs in steel they are no more than thunder in the distance on a spring night. Whether it means a real shower later in the year is open to much argument and speculation in the industry. It is clear to most people in steel that a lower ingot rate is a sure thing for the last quarter of this year—or sooner. The guessing game is around just how low it will or will not go.

The new element in the picture this week is the dark labor outlook. It will affect steel because auto strikes mean cutbacks in steel orders. Auto people will, if they can, stock some steel but there is a limit to what they can stash away until strikes are at an end.

If the cancellations from Ford and any other auto firm that may be hit by strikes are too heavy it means that other steel users will get their steel earlier than they thought. They may not want it that fast. But that decision may not have to be faced if steel runs into a long coal strike or a steelworkers' stoppage. Neither is too remote, judging from the current temper of labor.

If there is a coal strike—lasting for several weeks—steel ingot output may not be affected to the same extent as in other years. Stocks of coal and coke are heavy and are still being built up. That suggests that a strong front is being built up against any United Mineworker demand —which steel company coal mine officials consider unreasonable. But there is no telling what will happen in coal. Contracts may be signed quicker than now thought.

If there is no serious coal tieup a lot of steel consumers will have some extra steel. And some steel firms will have plenty of coal and coke to work off. But all these nice ideas can be knocked into a cocked hat if steel labor decides to be militant—to the extent that they will strike if they don't get what they think they want.

WHEN the steel ingot rate really begins to slip later this year it may establish a new pattern. Whether it goes down with a bang or whether it slides off slowly there will be plenty of difference district wise. This will be due to the F.O.B. method of selling steel.

Unless there is some legal clarification on freight absorption soon, which steel firms can confidently hold on to, Pittsburgh and Ohio Valley areas may be hard hit when orders fall off. Chicago furnaces may be running at a higher rate than Pittsburgh or Ohio Valley plants. As long as the customer has to pay the freight he will try to get all of his supplies close to home.

Mills which depend on remote consuming areas to keep their rates high will get hurt faster if the drop off in overall steel business is serious. It is significant that the Pittsburgh, Youngstown, Wheeling and Cleveland areas account for 43.4 pct of the total steel capacity for the whole country. That much consumption is not in those combined areas.

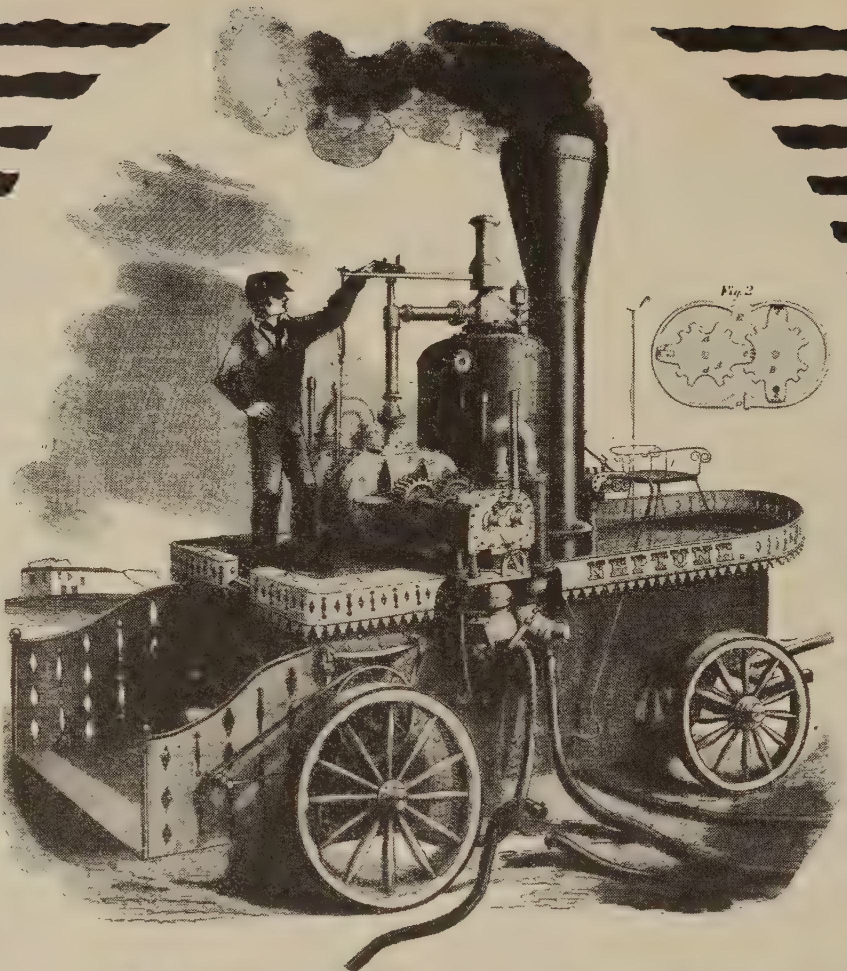
There is already a trend in this direction on plate. Plate is still so tight that midwestern consumers are paying whopping freight bills to buy it from mills in Pittsburgh and the East. Yet these same mills are now beating the bushes for third quarter plate orders. And Cleveland mills, which once had no room for plate business because of the demand for sheet and strip, are now very much interested in whatever plate specifications they can get.

ONE or two factors may keep the Chicago-Pittsburgh spread from being as great as it might have been under prewar conditions. One is the wider use of barge shipments by Pittsburgh mills to reach distant markets at rates that are competitive with rail shipment.

A second factor reducing the discrepancy between competing mills is the use of truck shipments. But truck shipment of steel may be approaching a limit. This limit is dictated by (1) load limits in certain states, notably Pennsylvania; and (2) strict enforcement of load limits in other states. A great many steel truck shipments are running well over legal load limits; some truckers have already complained that they cannot continue to adhere to rigid maximum loads and still make a profit. So far there has not been a full test.

The steel ingot rate this week is down 1½ points to 96 pct of rated capacity. It is also down 6 points from the high of 102 pct reached earlier this year.

There is nothing to bolster the scrap market this week. No buying of any moment occurred and heavy melting steel is off $1.00 in the Pittsburgh district. This drop wipes out the advance in the past 2 weeks due to a slight increase at Chicago. THE IRON AGE steel scrap composite is now $22.75, down 33¢ from a week ago, and matches the lowest level in the current decline, reached Apr. 19, 1949.



Before O'Leary's cow kicked up...

This proud beauty of a steam fire engine (circa 1856) was alleged to be capable of working up to 100 lbs. pressure in 7 minutes. The owners "pledged $1,000" that it would surpass all rivals in its second test at New York's Crystal Palace which (tsk! tsk!) burned to the ground 2 years later!

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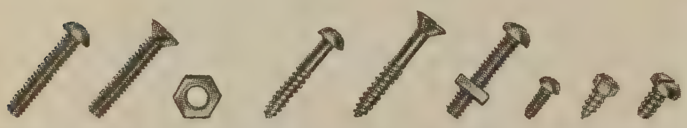
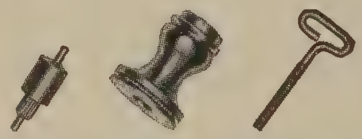
Write for catalog of complete line of Blake & Johnson fastenings.



Machine Screws and Nuts, Wood Screws, Stove Bolts, Tapping Screws



Screw Machine Products, Wire Forms, etc.

THE BLAKE & JOHNSON COMPANY

WATERVILLE 48, CONN.

bj

1849——*1949*

A *Century* OF MANUFACTURING OF FASTENING DEVICES FOR INDUSTRY

Forging Industry Feels Less Demand From Cost Conscious Buyers

Heavy Inventories, Steel Prices, Cancellations Responsible For Present Condition

○ ○ ○

By BILL LLOYD
Cleveland Regional Editor

○ ○ ○

Cleveland

• • • While the figures don't show it yet, the commercial steel forgings industry is back in a buyer's market.

This big and sudden transition took place early in April when what is described by one forge shop operator as "the quickest break in demand I've ever seen . . . we were OK Apr. 1," struck simultaneously major segments of the industry.

Briefly, the present condition of this most recent addition to the group of metalworking industry that have reached the end of the postwar rope and have returned to competition is this:

Orders during the past month have dropped 40 pct and little business is available.

Forging producers are getting a big volume of inquiries, probably indicating that forging customers are checking and studying their prices—which will mean, meet it or else in some cases.

(1) Some forge shops have plenty of orders but no releases on them.

(2) Cancellations are running 15 to 20 pct, but some have been reinstated on a long-term basis.

(3) Hold-up orders are coming in, extending delivery of pieces scheduled for July to September, for example.

Other evidence of the buyers' market includes a wrinkle being worked out by some forging customers wherein they want extended deliveries, perhaps 50 pieces a month on a 500-piece order with the price benefit of the 500 piece quantity run.

Other customers are including a sort of reverse escalator clause in the orders calling for a reduction on the forgings if the price of steel goes down before the required tonnage is ordered or while the work is in process.

Steel is no supply problem. The problem with steel, according to one forge shop operator, is to keep it out of the place. June shipments are likely as not to arrive the first week in May, which is some change after 3½ yr of begging for tonnage.

How the easing in steel has affected the drop forging business is evident in the fact that forging customers until very recently were satisfied to go along with their source where they had tooling set up. Now they are comparing prices and forge shops are getting inquiries on jobs that never came their way before.

Forge shops are working off their inventories of steel and lay-offs up to 30 pct of the shop force are not uncommon in the industry. Some plants are running 4 days a week.

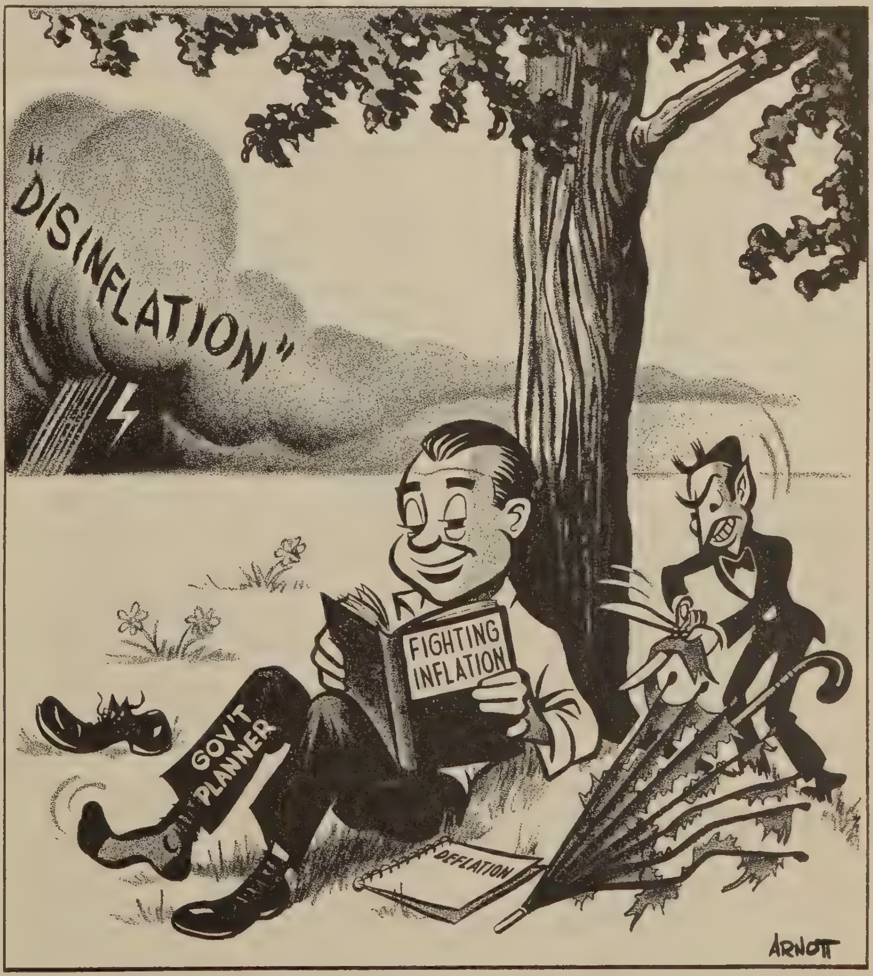
Outlook at the present is that May, June, July and August will be tough months for many segments of the industry and perhaps a period during which they will do well to break even if not lose money, according to some operators.

Some of the captive forge shops are trying to buy forgings on the outside to cover up some of their overhead.

Some observers feel that the commercial steel forging industry may be reaching a period when people lose their heads and quote scandalous prices simply to get business. Some, but not much of this has been done already.

Some observers question that

"BEG PARDON, BUT - - -"



there is enough business available to cut the price. Some forging customers simply won't buy now. And while bidding low on a job and taking it at a loss costs money, such jobs have the effect of carrying a portion of shop overhead.

Now the industry is going into the summer months when business is normally off about 25 pct.

The recent history of the commercial steel forgings industry gives little hint of the present drop in demand. Shipments hit a postwar peak of 132,000 tons in December, 6 pct higher than November shipments. Total 1948 shipments were 1,417,000 tons, 6 pct higher than the 1,334,000 tons shipped in 1947, according to the Dept. of Commerce. Unfilled orders Dec. 31 were 601,000 tons, a drop from the 621,000 ton backlog at the end of November, but slightly above the orders on hand at the end of December, 1947.

February, 1949 shipments of drop and upset forgings amounted to 80,000 tons, 11 pct below January shipments of 90,000 tons. Unfilled orders at the end of February were 440,000 tons, a 5 or 6 six months' backlog at the rate of shipments at that time.

Shipments of press and open hammer forging in February were 31,000 tons, 9 pct lower than the 34,000 tons shipped in January. Unfilled orders for press and open hammer forgings at the end of February totaled 100,000 tons, or about 3 months' backlog at the rate of activity at that time.

Total shipments of commercial steel forgings in March, according to the Dept. of Commerce, amounted to 120,035 tons, of which drop and upset accounted for 85,986 tons and press and open hammer 34,049. Total unfilled orders were 504,142 tons, of which drop and upset amounted to 410,248 tons and press and open hammer 93,894 tons.

Commercial drop forging plants' 1948 shipments amounted to about 917,000 tons, but today's conditions pose the question of what is a normal year for the industry. Some producers feel 1937 was a normal year when the industry shipped about half the 1948 tonnage.

Others take the position that 600,000 tons will be a normal postwar year for the drop forgers and they are probably right. Some producers feel that even with shipments of 229,000 tons of drop forgings during the first quarter the industry will do well to top 600,000 tons this year.

As the figures indicate, the forging business was tapering off during the first quarter, when the quick decline in demand took place. Reasons given for the drop are varied, liquidation of inventory by customers is most frequently heard. A second is cost consciousness and the anticipation of a steel price cut, which will lower the price of forgings. Going back a little further, demand from the petroleum, truck, pneumatic tool, tool, and agricultural industry is off, in some cases as much as 50 pct.

In the case of the agricultural implement producers, a proportionately greater part of their demand for forgings is being supplied by their own forge shops at the present time. During the reconversion period these shops couldn't handle the volume.

Bright spot for the forgers is the automotive industry with the exception of trucks. Here the demand is still good, but the buying is competitive.

Also, some forge shops are highly diversified and where there is jet work, or other special alloy work or other government contracts, there has been little curtailment of shop forces or working hours. Some of the forge shops on jet work have a 40 pct higher backlog than last year and production of this work is up.

Last December, most forge shops' biggest problem was getting forging quality steel at mill prices. Today, while some forge shop operators see in the present situation 1920-1921 all over again, many believe a $5 or $10 drop in the price of steel is all the industry needs.

J & L Slab Heating Furnaces Built Quickly

Pittsburgh

• • • **Completion in record** time of three slab heating furnaces for the 96-in. continuous hot strip mill of Jones & Laughlin Steel Corp. here was reported by Rust Furnace Co., the engineer constructor. The furnaces were built consecutively in 14½ weeks.

The first furnace was begun Dec. 1 and completed Jan. 15; the second, begun Jan. 24, was finished Feb. 23; and the third, begun Mar. 1, was heating steel on Mar. 30 after only 29 days.

Some 12 to 16 weeks is usually allowed for building a single strip mill furnace of this size. The new furnaces replace three originally built by Rust in 1936. Work was scheduled so that no more than one furnace was down at any one time.

Sells Pipeline for Profit

Washington

• • • **In one of the few deals** in which the government has realized full return or more of the original cost, War Assets Administration has sold a 100-mile natural gas pipeline in Louisiana to A. B. Harper, Fort Smith, Ark.

Purchase price was $5,257,000 against the original cost to the government of $2,718,000. The present appraisal value has been estimated at $6,750,000 because of strong competitive position and potential high earnings.

Coming Events

May 18-20	**National Steam Specialty Club**, annual meeting, Skytop, Pa.
May 19-21	**Society for Experimental Stress Analysis**, spring meeting, Detroit.
May 23-24	**American Steel Warehouse Assn.**, annual meeting, Atlantic City, N. J.
May 23-25	**American Gas Assn.**, production and chemical conference, New York.
May 25-27	**Gas Appliance Manufacturers Assn.**, annual meeting, Chicago.
May 25-27	**Machinery Dealers National Assn.**, annual meeting, Virginia Beach, Va.
May 30-June 1	**Metal Treating Institute**, spring meeting, Quebec.
June 2- 4	**Electric Metal Makers Guild**, annual meeting, Chicago.
June 16-17	**Malleable Founders Society**, annual meeting, Hot Springs, Va.
June 27-30	**American Electroplaters Society**, annual meeting, Milwaukee.
June 27-July 1	**American Society for Testing Materials**, annual meeting, Atlantic City, N. J.
July 11-16	**Concrete Reinforcing Steel Institute**, annual meeting, White Sulphur Springs, W. Va.

Liberian Mining Interest Receives Bank Credit To Assist Development Work

Washington

• • • **The Export-Import Bank** of Washington has authorized a credit of $4 million to Liberia Mining Co., Ltd., to be used to assist in financing the development of high grade iron ore deposits at Bomi Hills, Liberia, the building of a 45-mile railroad from the port of Monrovia to Bomi Hills, and the construction of ore handling and storage facilities at the port.

It is expected that the total capital cost of the project will be in the vicinity of $8 million, half of which will be furnished by the bank's loan. Approximately $1 million has been expended to date by the mining company on development work. The loan is contingent upon the carrying out of a recent agreement between Liberia Mining Co., Ltd., and Republic Steel Co. under which the latter will invest $3 million in the mining company and will execute a long-term ore purchase agreement for a portion of the annual production.

The loan from the bank will be repayable in 20 equal semiannual installments beginning Dec. 31, 1951, with interest at the rate of 4¾ pct. The credit will be available to the mining company until June 30, 1951.

The iron ore deposits at Bomi Hills are estimated to contain more than 20 million tons of high grade ore of over 65 pct iron. Large additional quantities of lower grade ore are also known to exist within the area. It is expected that construction of the railroad and installation of the mining equipment will permit iron ore deliveries to begin in 1951. An eventual annual production is anticipated of at least 1 million tons of high grade ore at a cost competitive with other sources of iron ore both in the United States and abroad.

The new credit increases the total of loans and commitments by the Export-Import Bank for the furtherance of American trade to $2570 million. It fulfills the bank's customary policy requirements of contributing substantially to the dollar earning capacity of foreign countries, in this instance Liberia, while at the same time giving adequate assurance of repayment from profitable operations. It is hoped by the directors of the bank that the loan will give impetus to other private capital investments in Liberia which will greatly increase that country's productive power.

Prior to making the commitment, the directors of the bank sent two members of the bank's staff, John D. Fitch, chief of the engineering division, and Richard N. Johnson, assistant treasurer, to Liberia to study not only the possibilities of the iron mine, but general conditions and developmental prospects in the African republic. The mission was assisted in its studies in Liberia by Dr. Thomas Thayer, a representative of the U. S. Geological Survey, and Oscar W. Meier, Chief of the U. S. Economic Mission in Liberia.

German Unionists Visit

Washington

• • • **Sponsored by the military** government, 11 German trade unionists—including one from the Union of Metalworkers—have begun a 2-month visit in the United States to get a few pointers from Americans as to how labor unions operate in this country. This is the first of several groups, involving a total of 50, which will make similar visits.

USWA to Seek Wage Increase, Pensions, Security

Pittsburgh

• • • **Union objectives** in 1949 USWA negotiations will include a wage increase for the entire membership, plus pensions and social security benefits. This was disclosed here last week by Steelworker President Philip Murray, following a meeting of the union's 200-man wage policy committee. Mr. Murray detailed the social insurance plan for the first time, said a definite wage demand figure had not been set, and came out for non-contributory pensions.

The Steelworkers will also seek elimination of the wage differential based on geographic location, now 18¢ per hr between common labor in the North and South. It will seek time and a half for all Saturday work and double time for Sunday work. Revision in seniority rules will be sought, plus improved vacations and a plan to handle declining employment. The annual wage will, as usual, come up for discussion.

Mr. Murray reported that there are 835 contracts subject to reopening on wages, pensions and social security. They cover 706,746 people, mostly in basic steel but also include a number of large fabricators. He said that there were 1221 additional contracts with expiration dates between February and December 1949. These cover 319,383 people, for a total of 1,116,000 employees.

No specific wage demand has been decided upon as yet, Mr. Murray said. "We expect this figure will be developed in the course of contract negotiations." The union thinking on pensions, he added, is that the employer should pay their full cost.

Principal features of the USWA social insurance program, estimated by the union to cost about 8.4¢ per hr, are: (1) an allowance of $35 a week for a worker disabled by sickness; (2) semi-private hospitalization for the worker's family at a cost not to exceed $10 a day; (3) free medical and surgical attention for the worker and his dependents over a 70-day period; (4) maternity care; and (5) a life insurance policy equal to 1½ years' pay.

The presidents of all companies covered by USWA contracts will receive a letter from Mr. Murray saying that pensions will be discussed in the forthcoming negotiations, even though their contracts may only provide for reopening on the subject of wages. Because of the variables involved in pensions, Mr. Murray said that the union had not estimated the cost.

Industrial Briefs . . .

• **Bush Honored**—Dr. Vannevar Bush, who as chairman of the Office of Scientific Research and Development was "chief of staff" for American science during World War II, has received the 1949 medal of the Industrial Research Institute. The medal is awarded for outstanding accomplishment in the management field of industrial research.

• **Light Gage Leader**—Edward A. Miller, manager of the Building Panels Div. of Detroit Steel Products Co., has been named chairman of the Light Gage Steel Manufacturers and Fabricators Group of the American Iron & Steel Institute.

• **Happy Anniversary** — The Odin Stove Mfg. Co., Erie, Pa., is celebrating their fiftieth anniversary this year and have announced their entrance into the electric range field.

• **Moves Uptown**—Kaiser Co., Inc., Oakland, Calif., has announced the removal of their eastern sales office from 30 Church St. to 620 Fifth Ave., New York, with W. F. Pelletier, eastern sales representative in charge.

• **Kepner Organized** — Kepner Products Co., a newly organized concern, has purchased a manufacturing building in Summit, Ill. The company intends to manufacture gears, pulleys and special machine parts for different types of internal combustion.

• **Branches Out** — Tinnerman Products, Inc., Cleveland, has announced the opening of a new sales branch office at 212 Dewing Bldg., 132 N. Burdick Ave., Kalamazoo, Mich. Harry J. Greer has been appointed branch manager and will operate in cooperation with Tinnerman's Detroit district office.

• **Buys** — Continental Foundry & Machine Co. has purchased the war surplus steel foundry in East Chicago, Ind., which they ran during the war. Sale price was $900,000 with $180,000 down payment. The plant has not been in operation since its shutdown in July 1945.

• **Going South** — The Hill-Chase Steel Co. of Baltimore, Maryland, has announced the opening of branch offices at the Central National Bank Bldg., 219 E. Broad St., Richmond, Va. C. A. Hummel is in charge of the new office.

• **Takes Over** — Continental Copper & Steel Industries, Inc., New York, has acquired all the fixed assets of the Madison Wire Co., Inc., Hanover, Pa. Continental intends to add machinery and equipment to the Madison plant in order to bring its capacity up to the full supply of its Hanover Wire Cloth Div. wire needs.

• **New Locale** — The Black & Decker Mfg. Co., Towson, Md., manufacturers of portable electric tools, has announced that its Indianapolis Service Station has moved to a new building located at 1125 W. 16th St.

• **More Space** — Marshall Steel Co. of Lisle, Ill., has announced the erection of a new plant in McCook, Ill. The new plant for production of precision ground flat tool steel is about triple the floor space of their present facilities.

• **Cylinder Agents** — The Hydro-Line Mfg. Co., Rockford, Ill., has appointed Leaser Engineering Co., LaPorte, Ind., and Euclid Machine & Sales Co., 1836 Euclid Ave., Cleveland, as exclusive representatives for their air and hydraulic cylinders and special machinery.

• **Factory Branch** — Chicago-Latrobe, Chicago, has announced the opening of their new factory branch with complete warehouse stocks at 111 E. Milwaukee St., Detroit. This branch will carry a complete line of twist drills, reamers, countersinks, counterbores and carbide tipped tools. The district representative will be William B. Crump and Joseph A. Wolfe.

Steel Construction Boom Seen Likely in Pittsburgh

Pittsburgh

• • • **The steel** construction business will be good here for the next few years and if certain tentative plans jell it will boom. Several large building projects are already approved and a number of others are planned.

Demolition work is now in progress in downtown Pittsburgh to prepare the site for the 39-story Mellon Bank-U. S. Steel building. Aluminum Co. of America has announced plans to erect a 30-story building nearby. In the same area, the Mellons have offered the city $4 million to buy land for a park project to include a 1000-car underground parking garage. Pittsburgh's mayor, David L. Lawrence, favors accepting the offer.

Meanwhile the Equitable Life Assurance Society of the U. S. is considering construction of three, and possibly seven, 20-story office buildings on a 23-acre site flanking the proposed park point at the tip of Pittsburgh's Golden Triangle. Several big companies have indicated they would take space in the Equitable buildings. They include: Westinghouse Electric, Pittsburgh Plate Glass, Mellon National Bank, Joseph Horne Co., Peoples Natural Gas, Westinghouse Air Brake and its subsidiary, Union Switch & Signal.

Big industrial construction projects include H. J. Heinz Co.'s $15 million building program and approximately $100 million in new construction, including six 250-ton openhearths, at Jones & Laughlin's South Side Pittsburgh Works. The latter hinges on acquisition of the necessary land, though less than half of it remains to be bought.

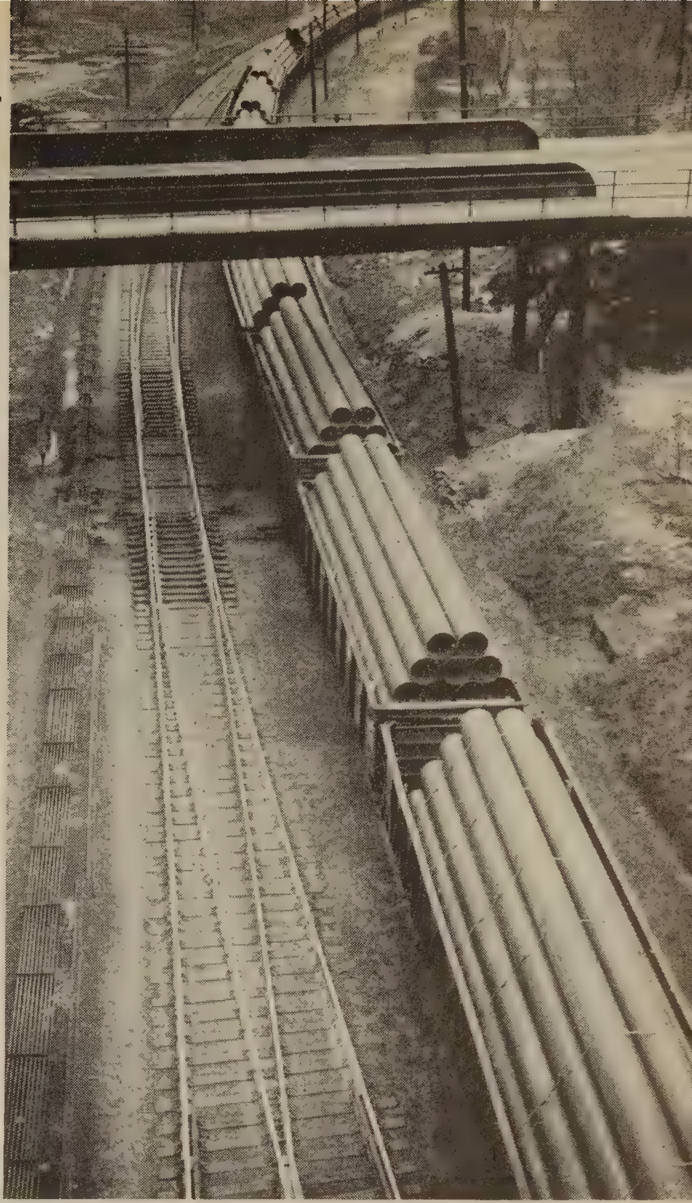
Will Open New Scrap Yard

Philadelphia

• • • **A new scrap yard** at Trenton, N. J., is soon to be opened by the Camden Iron and Metal Co. The new yard which will operate under the name of Trenton Iron and Metal Co. Div. of Camden Iron and Metal Co., will be located at 301 Enterprise Ave. The company also operates three foundry subsidiaries, two soil pipe foundries and a jobbing foundry.

Linepipe Supply Seen Remaining Tight for At Least One Year

By D. I. BROWN
Chicago Regional Editor



HOW LONG?—*A shipment of 24 in. welded steel linepipe leaving Milwaukee. With oil country pipe now caught up many are wondering when the linepipe shortage will end. Linepipe makers have orders into 1952 and they aren't worried about cancellations.*

Chicago

• • • **Generally steel** supply has either caught up with demand or is destined to do so quickly. The degree of easing in supply varies by products. However, there is one important exception to this general condition—linepipe. Casing and drill pipe are easy but linepipe, particularly in large diameters, won't be caught up for at least another year according to the best qualified men in the pipeline field.

The pressure is off for delivery of linepipe to be used to convey oil and petroleum products. But, the gas industry continues to clamor for pipe and present bookings show no signs of letup. As long as the welded pipe demand holds, carbon plates can't be expected to become too plentiful either, except that the relative capacity to produce plates alone is much larger than are the pipe making capacities.

Contrary to other industries conversion tonnages for linepipe are still booked through 1949 with some pipe makers. In fact, some conversion deals are firm for early 1950. Part of this is due to the fact that the arrangements can't be canceled but most such tonnages are still mandatory, the pipeline companies believe. More and more mill price steel through regular channels is going into pipe tonnages.

Pipe makers are assured of a better plate quota for third quarter. For fourth quarter they believe they will get all the plates they can cram through the electric weld pipe mills. Oil and gas companies holding quotas for plates originally intended for other applications like shipbuilding, construction, tanks, etc., are swinging these tonnages over to plates for linepipe.

It appears that by August or July the pipe makers will have more plates than they will be able to currently use and that the sole remaining bottleneck will be pipe mill capacity. So far this has been the case in a few instances. By early fourth quarter it is expected this will be a general condition.

Pipe makers with backlogs of gas and oil line orders into 1952 and in cases into 1954, aren't a bit apprehensive over losing these tonnages. They claim these orders are all firm and can't be canceled by the buyer of the line. Once the FTC grants permission to build a line, it's practically in the bag, the mills and pipeline companies report.

Another factor lending strength to the pipeline business is that investment houses regard pipelines as A-1 investments. There seems to be no limit to the amount of risk capital available to finance pipelines.

Delivery of linepipe has become better. The Sun-Sohio Line from Longview, Tex., to Lima, Ohio, will be built sooner than was expected because of improvements in pipeline deliveries. Pipe mills are expanding their facilities. More large diameter pipe capacity, up to 30 in., is expected to be installed within 12 to 18 months.

Better linepipe deliveries haven't satiated demand yet. It even appears that better deliveries may crystallize more orders for gas lines as the transmission companies become assured of more prompt deliveries of pipe.

The rapid easing of other pipe items for the oil and gas industry has surprised the trade. Drill pipe can be had out of stock in practically all sizes and all types needed. Deliveries of casing have improved substantially but are easy to a lesser degree than is drill pipe.

Oil country distributors in the southwest told IRON AGE that N-80, or deep well casing, and H-40, or shallow and medium well casing, are expected to improve substantially very soon. These companies went further and said that J-55 casing should be the last item to ease as most casing made is of this type for intermediate depth wells. In the past few years the emphasis has been on 5½ in. J-55 casing but oil and gas field operators told IRON AGE there is a decided trend back to the larger 7 in. casing that was popular a few years ago. Oil country tubing deliveries are still not as good as casing and drill pipe but are catching up also.

Distributors in the southwest told IRON AGE that the March improvement in the supply of pipe items is due to the drastic cuts in drilling schedules that haven't yet shown up in statistics. The continued decreases in the crude allowables permitted out of Texas have also been a factor. Oil industry observers are of the opinion that the April allowable cut in Texas crude will be the last cut. Roughly, Texas has cut their allowables by 25 pct while surrounding states have made merely token reductions.

At the moment there is nothing in sight to halt the better availability of oil country pipe. A good hotshot field of substantial area could change this but so far such a strike has not occurred. The usual exploration and development of new fields is continuing but on a much lesser scale than in the previous postwar years.

AMERICAN IRON AND STEEL INSTITUTE

SHIPMENTS OF STEEL PRODUCTS
ALL GRADES INCLUDING ALLOY AND STAINLESS
(Net Tons)

MARCH - 1949
Month

Steel Products	Number of companies	Items	Current Month			To Date This Year		
			Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)
Ingots, blooms, slabs, billets, tube rounds, sheet and tin bars, etc.	47	1	308,120	4.9	281,890	926,947	5.3	834,619
Skelp	5	2	11,305	0.2	47,579	* 22,761	0.1	* 120,875
Wire rods	19	3	57,166	0.9	30,970	165,538	0.9	77,877
Structural shapes (heavy)	11	4	394,344	6.3	3,224	1,111,289	6.3	8,141
Steel piling	3	5	32,064	0.5	25	79,520	0.4	949
Plates	28	6	684,468	10.8	22,502	*1,897,600	10.8	73,586
Rails—Standard (over 60 lbs.)	4	7	191,312	3.0	967	520,146	2.9	3,376
Rails—All other	5	8	16,033	0.3	370	46,720	0.3	512
Joint bars	7	9	11,694	0.2	4,232	36,140	0.2	9,519
Tie plates	6	10	48,595	0.8	-	126,309	0.7	41
Track spikes	8	11	11,290	0.2	-	34,963	0.2	35
Wheels (rolled or forged)	5	12	32,011	0.5	90	89,310	0.5	289
Axles	5	13	22,234	0.4	-	61,097	0.3	7
Hot rolled bars (including light shapes)	39	14	757,414	12.0	74,147	2,109,276	12.0	211,891
Hot rolled bars—Reinforcing	23	15	150,230	2.4	156	* 418,506	2.4	1,294
Cold finished bars	33	16	160,019	2.5	1,003	440,645	2.5	3,328
Tool steel bars	17	17	6,787	0.1	88	19,315	0.1	293
Pipe—Standard	16	18	210,198	3.3	5,364	583,809	3.3	14,784
Pipe—Line	12	19	228,310	3.6	2,036	596,574	3.4	6,605
Pipe—Oil country goods	14	20	164,079	2.6	9,038	403,693	2.3	25,447
Tubes—Boiler	3	21	11,712	0.2	956	31,375	0.2	3,353
Tubes—Mechanical and pressure	21	22	78,638	1.2	1,601	* 223,982	1.3	6,362
Miscellaneous pipe (including conduit)	11	23	27,825	0.4	66	* 76,625	0.4	784
Wire—Drawn	37	24	238,872	3.8	13,369	* 694,918	3.9	42,309
Wire—Nails and staples	17	25	83,761	1.3	1,286	231,316	1.3	3,596
Wire—Barbed and twisted	14	26	25,106	0.4	9	69,581	0.4	24
Wire—Woven wire fence	12	27	41,392	0.7	203	110,737	0.6	872
Wire—Bale ties	11	28	4,637	0.1	-	15,073	0.1	-
Black plate	10	29	60,739	1.0	43	195,577	1.1	43
Tin and terne plate—Hot dipped	9	30	158,898	2.5	-	441,462	2.5	10
Tin plate—Electrolytic	10	31	173,732	2.8	-	490,158	2.8	42
Sheets—Hot rolled	28	32	682,673	10.8	72,111	1,922,063	10.9	193,859
Sheets—Cold rolled	16	33	649,701	10.3	2,397	1,806,552	10.3	5,312
Sheets—Galvanized	15	34	153,931	2.4	86	425,617	2.4	255
Sheets—Long terne	8	35	13,386	0.2	121	39,348	0.2	348
Sheets—Enameling	7	36	19,362	0.3	104	62,239	0.4	401
Sheets—Electrical	11	37	42,875	0.7	-	132,674	0.8	-
Strip—Hot rolled	22	38	168,874	2.7	30,924	* 469,642	2.7	* 84,509
Strip—Cold rolled	34	39	170,370	2.7	2,039	486,332	2.8	* 6,527
All other	3	40	1,524	-	-	4,091	-	-
Total steel products	138	41	6,305,681	100.0	608,996	*17,619,520	100.0	*1,742,074

During 1948 the companies included above represented 99.5 % of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Revised.

Zinc Price Reduction Reflected in Lower Quotations for Pipe

New York

• • • **Reflecting reduction** in price of zinc, U. S. Steel Export Co., U. S. Steel subsidiary, announces the following new prices with freight included to New York, Philadelphia or Baltimore.

These prices will apply on carload lots and are effective with shipments made from the mills on and after 12:01 a. m. Apr. 29, 1949. Prices are subject to seller's current list of extras and deductions and conditions of sale. All sales are subject to seller's prices in effect at time of shipment.

American Standard Pipe, T & C Buttweld, 2½″ and 3″ Galvanized	25.1%
Seamless, 3½″ to 6″ Galvanized	17.6%
English Gas Tubes, T & C Buttweld, 2½″ and 3″ Galvanized	27%

Increase in Production Of Gray Iron Castings

Cleveland

• • • **R. L. Collier,** executive vice-president, Gray Iron Founders Society, told a group of gray iron foundry executives in Indianapolis that the industry has increased its share of the total market for all kinds of castings by 9 pct in the past six years.

Quoting casting production figures from the Dept. of Commerce, he stated that the industry shipments in 1943 represented 69 pct of all casting shipments, both ferrous and nonferrous. By 1947 the output of gray iron foundries had grown to 78 pct of the total.

New Facilities Completed

New York

• • • **Construction** of a new warehouse and office building for Harnischfeger Corp. at Teterboro, N. J., has been completed by the Austin Co. of Chicago. Purpose of the new facility is to enable Harnischfeger Corp. to enlarge its service to P&H customers in the eastern area.

The new building will provide 14,000 sq ft of floor space for equipment and facilities. Rail service will be over spur tracks of the Erie R.R.

Finished Steel Composite Price Change

New York

• • • **After consultation** with industrial and governmental statisticians THE IRON AGE has made certain changes in its finished composite of base prices for finished carbon steels. In recent years the composite has been weighted on the basis of quarterly shipments of various finished steel products. This weighting was too sensitive. Quarterly shipments of products have been subject to seasonal factors which on a yearly basis show little change percentagewise.

Beginning this week and revised to January 1941 all the finished steel base prices used in the composite have been weighted by the proportion of shipments of each item to the total shipments of all items included in the composite in the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. War years were excluded because distribution was dictated by the government.

The 4-year period before the war and the 3-year period after the war, THE IRON AGE believes, represented a normal distribution of the steel products used in THE IRON AGE composite. The distribution of shipments among products in the prewar period does not differ greatly from that in the postwar period. The difference between the old composite and the new one is only a small fraction of a cent per pound.

The composite price was published on a weighted basis for the first time in Aug. 28, 1941. Then, the composite was revised for the years 1929 to 1940 inclusive based on finished steel shipments in the 1929 to 1939 period. The composites for the years 1941, 1942 and 1943 were based on shipments in those years. On Nov. 16, 1944, the composite was changed to reflect quarterly shipments.

Because the method now adopted is more correct in reflecting price changes, revisions were made back to 1941. This method which is similar to the one used for the years 1929 to 1940 will be continued in the future.

Should there be basic changes in the pattern of steel shipments the weights of course will be reviewed to determine if a change is necessary. Changes in the composite will now reflect changes in base prices of the component products exclusively, because the weights will be held constant.

Changes In The Iron Age Finished Steel Composite Price By Periods

Period	Composite (cents per pound)
Jan. 1, 1941 to Jan. 15, 1945	2.396
Jan. 16, 1945 to Mar. 5, 1945	2.427
Mar. 6, 1945 to May 28, 1945	2.433
May 29, 1945 to Feb. 18, 1946	2.464
Feb. 19, 1946 to Dec. 9, 1946	2.719
Dec. 10, 1946 to Dec. 16, 1946	2.734
Dec. 17, 1946 to Dec. 30, 1946	2.765
Dec. 31, 1946 to Jan. 6, 1947	2.848
Jan. 7, 1947 to July 28, 1947	2.884
July 29, 1947 to Feb. 16, 1948	3.193
Feb. 17, 1948 to May 3, 1948	3.241
May 4, 1948 to July 26, 1948	3.211
July 27, 1948 to Aug. 2, 1948	3.721
Aug. 3, 1948 to Feb. 14, 1949	3.720
Feb. 15, 1949 to Mar. 14, 1949	3.717
Mar. 15, 1949 to Mar. 28, 1949	3.714
Mar. 29, 1949 to Apr. 11. 1949	3.711
Apr. 12, 1949 to May 2, 1949	3.708
May 3, 1949 to	3.705

The Iron Age Revised Finished Steel Composite Price

(cents per pound)

	1941	1942	1943	1944	1945	1946	1947	1948	1949
January	2.396	2.396	2.396	2.396	2.412	2.464	2.877	3.193	3.720
February	2.396	2.396	2.396	2.396	2.427	2.555	2.884	3.125	3.719
March	2.396	2.396	2.396	2.396	2.432	2.719	2.884	3.241	3.715
April	2.396	2.396	2.396	2.396	2.433	2.719	2.884	3.241	3.709
May	2.396	2.396	2.396	2.396	2.436	2.719	2.884	3.214	.....
June	2.396	2.396	2.396	2.396	2.464	2.719	2.884	3.211	.....
July	2.396	2.396	2.396	2.396	2.464	2.719	2.914	3.293	.....
August	2.396	2.396	2.396	2.396	2.464	2.719	3.193	3.720	.....
September	2.396	2.396	2.396	2.396	2.464	2.719	3.193	3.720	.....
October	2.396	2.396	2.396	2.396	2.464	2.719	3.193	3.720	.....
November	2.396	2.396	2.396	2.396	2.464	2.719	3.193	3.720	.....
December	2.396	2.396	2.396	2.396	2.464	2.747	3.193	3.720	.....
Average	2.396	2.396	2.396	2.396	2.449	2.686	3.014	3.434	

Rebuilt German Foil Mill Equipment Now Rolling for Kaiser

New York

• • • **The easing in** demand for aluminum products in the last few months has fostered the entry of aluminum producers into markets in which they had not formerly been active. Both Reynolds Metals Co. and Permanente Metals Corp. have taken steps to enter the rod, wire and cable field. All producers are busily engaged in cultivating the industrial plant building and farm building markets.

Now Permanente Metals Corp. is entering into production of aluminum foil at its former magnesium plant at Permanente, Calif., using former German foil mill equipment in its operation.

Permanente engineers, aided by the Loewy Construction Co., New York, have completely redesigned all machinery, and have doubled its capacity. According to Works Manager Roger Laufer, the plant is expected to produce between 500,000 and 750,000 lb of foil a month.

From the Trentwood rolling mill at Spokane come the coils of 0.026-in. aluminum sheet, ranging in width from 19 in. to 32 in., and in weight from 500 to 800 lb. The foil plant reduces this to thicknesses as minute as 0.00025 in.

Only the purest of aluminum can be used in foil making. From metallurgical, casting, rolling and mechanical standpoint. Trentwood must exercise more care in producing for foil rolling than for any other type of end use. Any slight imperfection in the metal shows up glaringly in the tissue-thin foil. Carefully wrapped and handled to protect the coils from damage and dirt, they are shipped to Permanente where they are weighed and stored in respective sizes behind the first pass mill.

Each pass through a mill reduces gage by about 50 pct. Therefore a single first pass mill can keep two second pass mills busy, and they in turn can supply four third pass mills. Thin gage foils must be run through as many as six mills before they reach desired thinness.

Foil rolling is primarily a cold rolling process. Surfaces of the rolls must be ground with accuracy and to such high degrees of polish that even a grain of dust or a human hair would mark them and necessitate regrinding. Consequently every precaution must be taken to protect mill surfaces from foreign material.

Foil for the lighter gages is rolled to a point where it is necessary to run two sheets together before further reduction can be undertaken. Thus two rolls are combined on doubling machines to form a single roll with the added strength for handling. After a final pass, the double roll is sent to the separating machine where it is unwound into two rolls of extremely thin foil.

INSPECTION: *Main cylinder of a large hydraulically actuated press at Carnegie - Illinois Steel Corp. A 27-ton forging of 6 ft ID. The whole interior working surface is plated with industrial chromium to a thickness of 0.15 in. The hard, wear-resistant chromium is designed to prevent corrosion, increase packing life and afford prolonged operation.*

During rolling processes, aluminum, like any other metal, becomes brittle and hard. Although in this state it has a higher tensile strength, it tears easily and cannot be handled. To make it pliable and soft, the completed rolls of foil are heated to 400-800°F in annealing ovens.

Heat treating accomplishes a double purpose. The ovens anneal the foil, and also burn off the oils used during rolling, leaving the metal clean and dry, readily susceptible to taking water soluble glues and adhesives used by converters in laminating with paper. When taken from the ovens, the foil is in widths as rolled, but it can be slit into ribbons as narrow as one-half in. on spooling machines.

The German foil mills, now rebuilt and redesigned, are turning 900-ft-long coils of aluminum sheet from Trentwood into 13 miles of foil 0.00035 in. thick.

Permanente Completing New Ohio Aluminum Mill

Newark, Ohio

• • • **Production** will get under way in June at the new Kaiser aluminum rod, bar, wire and cable mill at Newark, Ohio, according to D. A. Rhoades, vice-president and general manager of The Permanente Metals Corp.

The first section of the new mill to start operations will be the remelt department where ingot is prepared for the rod mill. Work in this department must necessarily start in advance of rod mill operations in order to build up a supply of billets. Initial shipments of ACSR (aluminum cable steel reinforced) and all aluminum cable will begin in July.

The completed Newark plant will have an annual capacity in excess of 100 million lb of electrical conductor material. The new mill together with existing plant equipment will give Permanente facilities for the production of a wide range of aluminum wire as well as rod, bar and structural shapes up to a maximum of 8 in. in diam. Although original plans call only for the production of wire and cable, the company expects to manufacture a number of related products within the next year.

The start of the remelt department follows 5 months of intensive rehabilitation work during which furnaces and casting equipment have been completely reconditioned and modified to handle the requirements of Permanente's new mill. Actual production is being preceded by experimental casting which is now in progress to test new equipment and to prepare for continuous production.

Production at the new Kaiser Aluminum plant will climax 18 months of extensive preparation involving the expenditure of approximately $4 million in the design, construction and installation of cable mill equipment. Actual construction started Dec. 1, 1948 when the company took possession of the huge Newark aluminum plant which has been idle since the fall of 1945. The plant was built by the Defense Plant Corp. for the wartime production of aluminum blooms and forging stock as well as large size rod, bar and structural shapes. Its 28 acres of floor space provides ample room for the installation of the new mills without materially altering its designed production capacity.

Curtailments Close Foundry

Hopedale, Mass.

• • • **The Draper Corp.,** largest manufacturer of cotton looms in the world, has announced that it was closing its Framingham, Mass. foundry, Sept. 2. Approximately 200 persons will be out of work. The announcements also said that because of a general curtailment in the textile industry, the corporation might have to cut down production in other departments.

Jobless Claims Up

Washington

• • • **A slight rise** in unemployment claims for the week ending Apr. 23 does not mean a rise in jobless workers, according to government officials, but is largely due to renewed eligibility because of the beginning of a new quarter. About 15,500 new claims were filed during the week which, with continued claims, brings total claims to 2,312,200 (about 6 pct of covered workers).

Decline in Durable Goods Buying By Farmers Seen Real Threat to Steel Later

Ithaca, N. Y.

• • • **Durable goods** buying by farmers has declined in recent months. The drop in hardware and farm implements and other long lived purchases has been sharp. Those following such activity in New York, Pennsylvania and New Jersey feel that the leveling off in farm buying is significant. They say that it matches the trend in industrial centers.

Reports here coincide with opinion in the Chicago area where buying of implements, large home appliances and farm building supplies has been on the downgrade. The change in farm purchasing was sudden but not unexpected. This lower level of buying in the farm belt regions will be felt in industrial plants soon and in such places as steel mills later in the year.

For the past several years farmers have "been in the money." They have spent vast sums to fix up homes and buildings and replace equipment. Purchases of new farm machinery were large. So also were purchases of freezers, refrigerators and other household appliances. But in recent months farm people have sensed a declining market both in the prices they get and in the prices they pay for products. The result has been a sudden hesitancy in parting with cash still left in the bank.

Reports from upstate New York farm centers show that implement distributors have quite a few machines on *their hands* and not on the farms. A real selling job has to be done to move items that were eagerly sought only a few months ago. The general trend to pay spot cash seems to be at an end. Time payments for farm implements and other machinery is the general rule now—when sales are made.

As far as hardware items, roofing material and small tools are concerned, there is no rush to get them now that the farmer knows they are available. This mood is having a gloomy effect on salesmen and distributors. It is also proving that a large part of the present sales forces in the country still have to be put to the test. At least that is the opinion of some of the old timers.

This lethargy in farm area buying is causing steel people who sell in or for agricultural areas to take a sober outlook on future sales of steel for hardware, farm implements, dairy machinery, trucks and other items which have boomed for several years.

DIESEL TUGS: *Believed to be the first diesel-electric tugboat on the inland rivers, this craft is now in 24-hr a day service shifting coal barges at Clairton Works of Carnegie-Illinois Steel Corp. It was built by St. Louis Shipbuilding & Steel Co., of all welded construction using USS Cor-Ten hull plates.*

W. T. Mossman Dies, Former J & L Adviser

Pittsburgh

• • • **William T. Mossman,** the first public relations man the steel industry ever had, and a well known figure in the newspaper and advertising fields, died here May 6. W. T., or "Bill" as he was known to two generations of Pittsburghers, was 76 years old and had retired from Jones & Laughlin Steel Corp. in 1947 after 40 years of service to the company.

Though he had directed J&L's public relations and advertising policies since 1907, Mr. Mossman never had a title. He didn't want one and always referred to himself as just a "press agent." His position had been created as a temporary expedient by B. F. Jones, Jr., who was uneasy over President Theodore Roosevelt's attacks on big business.

Big business operated under a mask of secrecy at that time and many a mossback thought Mr. Mossman's job was to keep J&L's name out of the papers. It took him a good part of a lifetime to prove they were wrong; many policies which are accepted gospel today were labeled "poison" when Bill Mossman began pioneering in public relations.

Swiss Firm Buys Mills To Roll Aluminum Foil

New York

• • • **Aluminum Foils, Inc.,** has placed an order with Lewis Foundry & Machine Div., of Blaw-Knox Co., Pittsburgh, for mill equipment for rolling aluminum foil in a new plant now being erected at Jackson, Tenn. The contract is unusual because it represents the investment of foreign capital in new enterprise within the United States.

Aluminum Foils is a wholly owned subsidiary of the Swiss Aluminum Co. (S. A. pour l'Industrie de l'Aluminum) of Lausanne, Switzerland. The company reports that its new plant in Tennessee will be one of the most up-to-date installations in the world for rolling very thin gauge aluminum foil.

The award to Blaw-Knox involves more than $1 million and covers several stands of Lewis 2-high and 4-high mills, as well as all auxiliary rolling equipment. Lewis reports that the units on this order will be designed to give a high yield of precision rolled foil in thicknesses down to 0.0002 in.

Centrifugal Compressors for Hydrocol Plant

Olean, N. Y.

• • • The centrifugal type compressor has been used in Europe for more than 45 years and in this country for about 25 years. But it is still new compared with the more established type of compressor equipment.

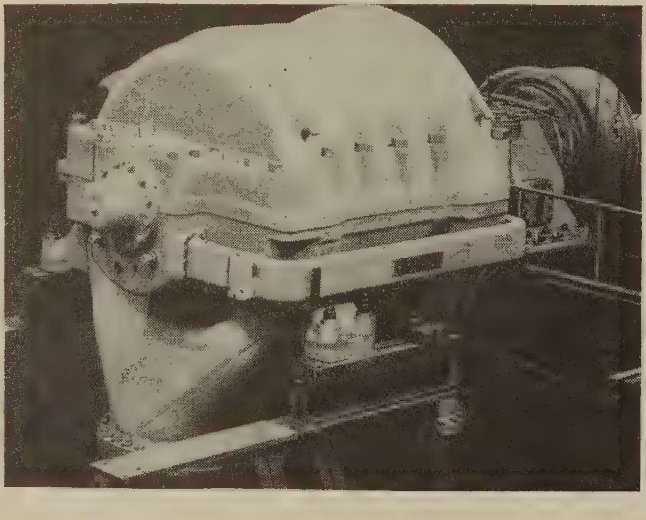
Up-to-the-minute application is a new compressor made by Clark Bros. Co., subsidiary of Dresser Industries, Inc., to be used in the Texas Hydrocol Process plant for making gasoline from natural gas. These centrifugal compressors were shown publicly here last week for the first time.

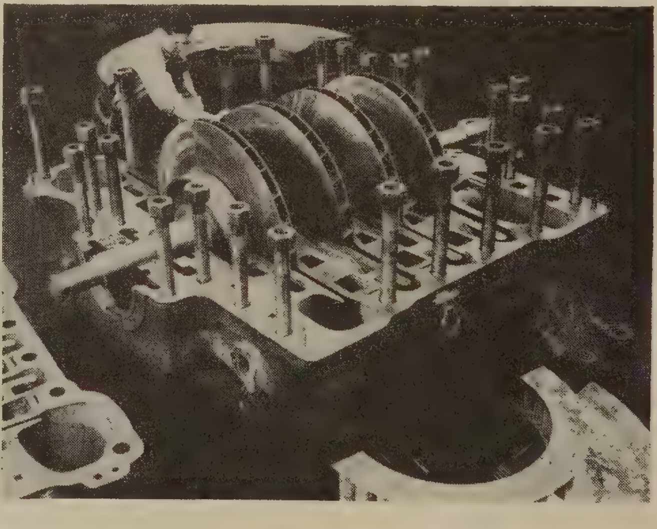
The centrifugal compressor consists basically of a number of "wheels" or impellers mounted on a shaft which is rotated at a very high speed by a steam turbine. The air or gas is introduced into the "eye" of the impeller near the shaft, after which it is thrown out at high speed toward the casing by centrifugal force. The impellers are similar in appearance to the old fashioned water wheels formerly seen near mills.

Compression of the gas by this means is done, not by physically decreasing the volume, as with a piston, but by accelerating the gas to a high velocity then slowing it down somewhat in the compressor, changing velocity into pressure.

The No. 5 Hydrocol unit under test required considerable advance in engineering beyond any similar type of machine built in the past, according to F. W. Laverty, general sales manager at Clark Bros., either because of the relatively large volumes or pressures or both.

These centrifugals will compress six different kinds of gases varying from the air we breathe to pure explosive oxygen. The two main compressors will compress 110,000 cfm of air to 100 psi with a power requirement of 23,000 hp.





Norway Strives for Self Sufficiency By Studying Our Equipment and Practices

Washington

• • • **Bent on not only recovery** but on raising industrial production considerably above prewar levels, Norway is sending engineers, technicians and labor leaders to the United States under auspices of the Economic Cooperation Administration to study American equipment and practices.

Arriving this month are two groups of steel men, an engineer interested in manganese mining and production, and a fourth group for study of general mining. Still another steel group will arrive in September.

In the meantime, a 7-man party of labor leaders has just concluded a 30-day study of American labor methods and practices. Two additional groups from nonmetal fields are now in the midst of industrial studies.

Since Norway is largely pulling herself up by her own bootstraps, these study tours are expected to be invaluable in making the most efficient use of existing facilities. ECA dollar aid last year amounted to about $80 million; it will be increased this year to about $105 million, largely in the form of machinery and capital equipment.

Beginning in mid-May, three steel engineers will spend 30 days in the United States visiting steel plants and observing equipment and methods. They will return to assist in constructing the proposed new Norwegian steel plant at Mo-i-Rana.

At the same time, two metallurgical engineers will study processes involved in making ferroalloys. They are especially interested in American methods of manufacturing low carbon ferrochrome and ferrotitanium. During their tour, they will study operation of modern furnaces for the production of ferrosilicon and use of high frequency sound for removing ferrosilicon gases.

The steel group which will make the trip this fall will be comprised of men from the Christiana Spiegerverk Steel Co. It will study methods and operations.

Increased steel and mining capacity is an important factor in Norwegian reconstruction. Nearly a fifth of the nation's wealth was lost in the war, including German destruction of its major steelmaking and metalworking facilities and iron mines. Prewar standards are hoped to be reached again before 1952 with a minimum of dependence upon other nations.

Planned ore and steel expansion will greatly reduce Norway's dependence upon the United States and Belgium by that time when output is expected to be double the prewar quantities—exclusive of that of the new plant.

Completion of the latter in 1953 is expected to jump potential production to about 540,000 metric tons. Output in 1938 was about 35,000 tons which will be upped to 77,000 by 1952.

Also arriving here in early May will be six mining experts who will stay from 2 to 6 months. Concerned mainly with restoration of Norwegian iron mines, they are especially interested in American methods for open pit mining, pelletizing and crushing of iron ore.

Included in this group will be two officials of the Syd-Varanger iron mine—Arne Stagang and Arne Hofseth. The group, arriving in early May, will visit Washington, take in the coal exposition at Cleveland, visit the Mesabi range, and study production in other areas.

At the same time, Torgeir Hoverstad, manager of the Porsgrunds Elektrometalurgisk Co., will make a study of electrolytic methods of producing manganese metal. Norway has a problem in utilizing low grade manganese ores to best advantage.

Mining expansion is equally important with steelmaking in helping Norway to realize its plans for bringing exports-imports into better balance. This industry has been a weak spot in Norwegian economy as a result of German destruction of the country's main ore source—the Syd-Varanger ore mine and concentration plant.

From an annual output of 1.5 million metric tons of ore in 1938, production was still down to 300,000 tons last year. Quickest possible restoration of the pit and concentration works is an immediate must if production is to be back at prewar levels by 1952—the current goal.

While the immediate emphasis is on restoration and expansion of mining and steel, effort will also be centered on construction of more electric power facilities. Another 4000 kw capacity is to be built over the next 2 years. With this boost in power, aluminum production is expected to be boosted three-fold, from the current 30,000 metric tons to at least 95,000 tons or 210 million lb by 1953.

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MOUNTAIN MOVER: *In an average month this 40 cu yd bucket on a Marion power shovel will drop the level of 10 acres of earth and rock by 50 ft. The bucket must resist the impact and abrasion of moving between 800,000 and 900,000 cu yd a month.*

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Sharp Price Dips, Mine Closures May Stiffen Metals Market

Firms With the Higher Break Even Points Have Halted Operations Already

° ° °

By JOHN ANTHONY
Eastern Regional Editor

° ° °

New York
• • • **Sharp** declines in the prices of the major nonferrous metals, coupled with recent decisions by a number of mine producers to close down some or all of their mining operations, has prompted some observers to speculate on the probability of a strengthening of the markets.

Wage rates now applying to mining, smelting and refining operations are very high, causing the current break even point for all producers to have been raised above any previous experience. This situation has been reflected by the quick reaction to lower prices by many producers. Other developments along this line are sure to follow unless metal demand picks up.

So far the following reductions of operations have been announced: Calumet & Hecla Consolidated Copper Co. has discontinued its mining operations in Michigan. It has long been recognized that this production is a high cost operation which would be among the first to be affected by a declining copper market. There are other high cost domestic operations, however, and further announcements may be expected unless the market stiffens soon.

Morris LaCroix, president of Copper Range Co., has stated that the management is now considering whether or not to close down its Northern Michigan operations because of the low price of copper.

The Tri-State District of Missouri, Kansas and Oklahoma, high cost producing area for zinc and lead, had already suffered the loss of 13 zinc mines and nine mills at the 13¢ price level. At the current 12¢ price, there is no doubt that further closings are under consideration.

At Park City, Utah, the lead and zinc recovery from old tailings has been suspended by the Pacific Bridge Co. in Utah, three operators have cut the work week from 48 to 40 hr to eliminate overtime. Layoffs are reported from Montana and Nevada. In the Couer d'Alene region of Idaho, some zinc producers will be forced to cut costs or close down within a few weeks, according to a survey made by James K. Richardson, manager, Utah Mining Assn.

One of the most important effects of the lower metals prices is the necessity to curtail or abandon exploration and development work. Most operators have been spending heavily for this work, stimulated by the high demand for metals.

Metals producers are convinced that the current restricted buying for inventory reduction and its effect on the markets is not representative of the actual condition of business activity. There have already been a few indications of improvement in consumer and industrial demand in some fields. There is some fear that buyers may reenter the market en masse with a quickening in business tempo. Then shortages might well push prices up again. This is one

50 YEARS AGO

THE IRON AGE, *May 11, 1899*

• "Although the ordinary anvil is being gradually displaced by steam and drop hammers, it is more than doubtful if it will ever be entirely superseded by any other device or appliance upon which to pound and shape things."

• **"The retirement of Andrew Carnegie from active participation in the steel business is an event of the greatest significance."**

• "The union molders in the various foundries of Massachusetts and Rhode Island have inaugurated a strike. They have been out for more than a week, and according to reports from that section seem to be delighting with their striking success. They have no doubt caused considerable annoyance to their employers, but we have not heard of any of the shops shutting down. The molders are holding out for $3 per day."

• **"The boom in copper has caused such a revival of activity in the Lake Superior copper region that there is a great scarcity of dwellings for the numbers of miners and workmen who have lately gone into the district."**

• "A new boat propelled by a carbonic acid gas engine, which has been built at Kingston, N. Y., will shortly be tested on the Hudson River by a board of naval officers."

• **"So thoroughly are the natural advantages of Buffalo as a steel manufacturing locality appreciated in the iron trade that quite a number of projects have been put forward in recent years to establish the industry there."**

• "Another order for locomotives for England has been placed with the Baldwin Locomotive Works, Philadelphia. The present order is for 20 engines for the Great Central Railway, to be used for hauling heavy freight trains."

• **"The big shipyard of the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., is at present a theater of remarkable activity. The shipbuilding contracts now in hand aggregate in value $18,580,000, embracing a total tonnage of 115,035."**

of the principal reasons that major mine producers of copper had been unwilling to follow on copper price action downward initiated by custom smelters.

How the break even point has been increased in comparison with prewar years is particularly significant to consumers because of its impact on the willingness of mining companies to continue mining operations in a declining market. Today mining companies are spending heavily to mechanize their operations to keep abreast of the constantly rising labor cost.

Ten years ago the tools and equipment commonly used to advance a drift heading consisted of a few shovels, picks, and other small tools valued at $50, plus a hand cranked Leyner drill, arm and column valued at $550, and a few mine cars trammed by hand. Today, it was reported by W. C. Page of U. S. Smelting Refining and Mining Co. at the recent meeting of the American Zinc Institute in St. Louis, a drift crew uses a $2800 mechanical mucking machine, an $800 automatic feed Leyner drill, a $200 cherry picker, a $2000 jumbo and a $3100 storage battery locomotive. This is a total of $8900 versus $600 in 1939.

Today one large deep lead-zinc mining company has an equipment investment of $30,000 for each working face, which permits advancing by more than double that per man-shift in 1939. Modern shaft sinking equipment employs a $5500 clamshell mucking device, compared with the cost of a few shovels in 1939.

The average labor cost in 1948 per ton mined for the lead-zinc mining industry is reported by Mr. Page after an industry survey to be 135 pct higher than in 1939. In the West, the increase in labor cost was 190 pct. Supply costs increased an average of 113 pct during this period, but in the West the cost of mining supplies was up by 165 pct.

In 1939 the total labor cost per ton mined was approximately 55 pct of the total operating cost per ton mined. Today the total labor cost is closer to 70 pct of the operating cost.

Unit production of ore per manhour has increased by 55 pct since 1939 because of greater mechanization. But the overall operating costs per ton have increased by 105 pct.

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Test New Use of Fine Ore

Pittsburgh

• • • **Employing a variation** of the Disco smokeless fuel process, Pittsburgh Consolidation Coal Co., in collaboration with National Steel Corp. and M. A. Hanna Co., is making exploratory tests of a new method of using extremely fine sizes of iron ore in blast furnaces.

The Disco process is continuous low-temperature coal carbonization. By producing a ball of partially coked coal and fine ore its owners see a possibility of eliminating the sintering normally required with fine grained ores obtained from taconite.

The new development involves a two-step test procedure. First, fine sizes of iron ore and metallurgical coal are mixed and passed through the process which agglomerates the mixture into ball-shaped lumps for use in the blast furnace burden. This part of the program is being carried out at Pittsburgh Consolidation's experimental facilities near Imperial, Pa.

The second step involves the experimental use of the agglomerate in a blast furnace of the Weirton Steel Company. These tests have not yet been started.

The new technique has been under development for several years by the Disco Co., a subsidiary of Pittsburgh Consolidation Coal Co., and patents on the process are held by this company.

Constructing 29 Bridges

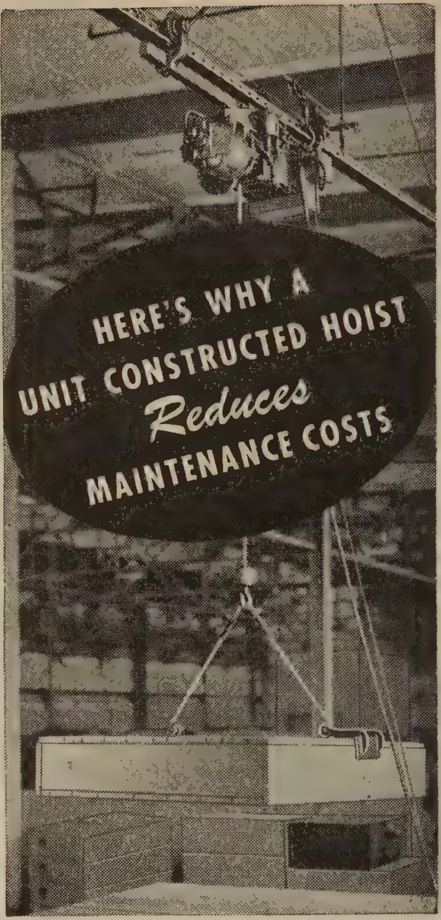
Boston

• • • **Twenty-nine bridges** costing $14,542,000 are now under construction in Massachusetts, State Commissioner of Public Works William F. Callahan has reported. The largest contract is for the East Boston Elevated Expressway running out to Logan Airport.

Cuts Working Force

Newport, R. I.

• • • **Capt. William A. Riley**, commanding officer, has announced that the Newport Naval torpedo station will lay off 110 employees before June 30. The new layoffs will cut down the station working force to 576, the lowest figure in more than 20 years. During the war, the station employed 13,000 persons.



● Maintenance men know from experience how little it costs to service a hoist that is simple in design. That's why it will pay you to switch to the simple construction of a Reading UNIT CONSTRUCTED Electric Hoist.

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Assure yourself of these cost-reducing advantages—contact your nearest Reading Hoist distributor, today. And for full details on the Reading UNIT CONSTRUCTION Plan, write us for your free copy of "144 Answers To Your Hoisting Problems."

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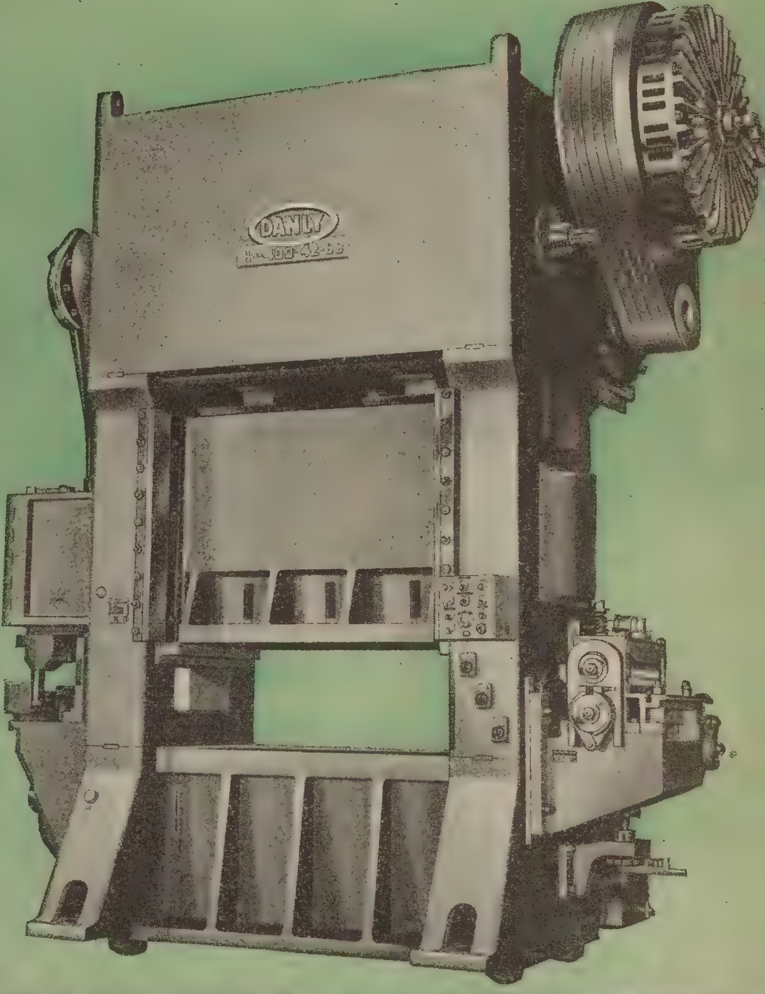

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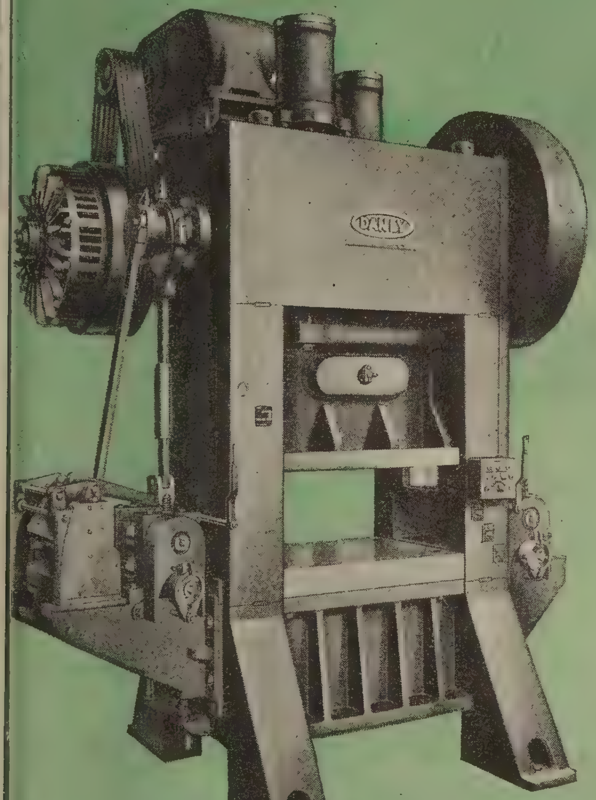
SPEEDS: 20-80 S.P.M. STROKES: 4-8 INCHES



DANLY SERIES HA 50 TO 150-TON
GEARED ECCENTRIC SHAFT DRIVE
SPEEDS: 40-150 S.P.M. STROKES: 3-7 INCHES

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In addition to the Danly Heavy-Duty *Autofeed* Presses, there is a complete Standard *Autofeed* Line of presses available from 50 to 150-ton capacities. The standard line is built with the same high precision and also has the same exclusive Danly mechanical features as the extra-massive Heavy-Duty *Autofeed* presses.

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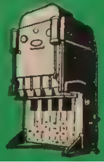
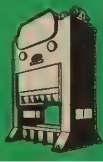
2100 SOUTH 52ND AVENUE • CHICAGO 50, ILLINOIS





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(Above) Typical small-size R-C Meter with inclined differential gauge, with top inlet, and outlet in bedplate.

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(Right) Example of large-size, low-pressure R-C Meter, side inlet box and bottom outlet, with a P.V.T.T. Recorder.

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Warehouse Assn. Holds 40th Annual Meeting

Cleveland

• • • **The 40th annual meeting** of the American Steel Warehouse Assn. will be held May 22 and 23, at the Ritz-Carlton Hotel, Atlantic City, N. J. The two day session will be featured by technical talks and an announcement of honorary members.

Leo Wolman, Professor of Economics, Columbia University, will talk on "Labor Policy and Labor Law." Another highlight of the meeting will be a panel discussion led by A. W. Herron, Jr., on "F. O. B. Pricing in Buying and Selling."

TENTATIVE PROGRAM

Sunday, May 22

1:00 p. m.—Directors' Luncheon and Meeting, Parlors 1 and 2.
2:00 to 6:00 p. m.—Registration in the Foyer.

Monday, May 23

9:00 a. m.—Registration in the Foyer.
12:30 p. m.—Luncheon-Dining Room.
Edward L. Ryerson, Chairman of the Board, Inland Steel Co.
2:30 p. m.—Meeting—Ball Room.
"Labor Policy and Labor Law"—Leo Wolman, Professor of Economics, Columbia University.
Walter S. Doxsey, president, American Steel Warehouse Assn.
Making Men with Movies
The Big Swindle
Albert in Blunderland
Meet King Joe
10:00 p. m.—Rendezvous—Ritz Tavern.
Dancing, entertainment, movies.

Tuesday, May 24

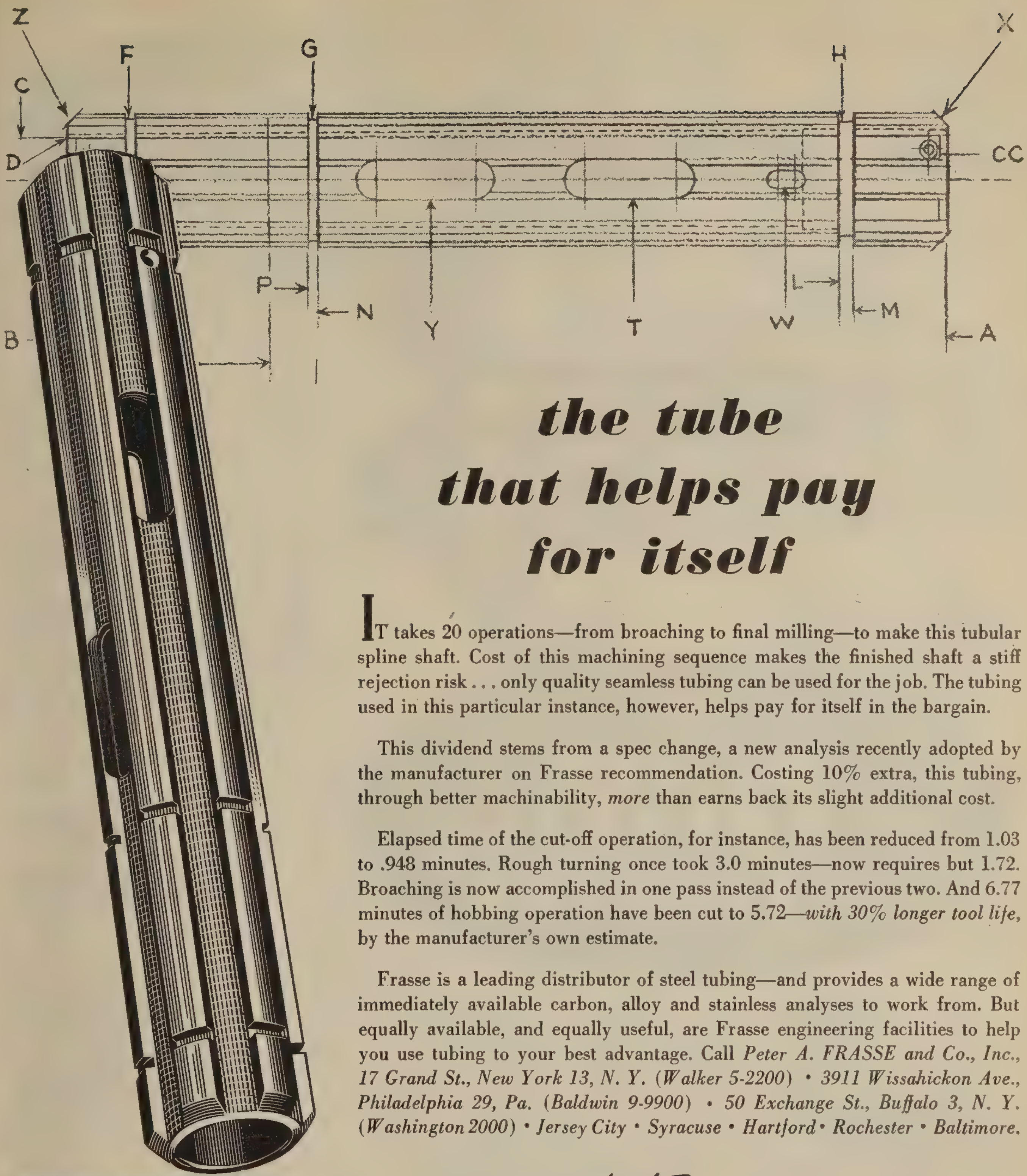
10:00 a. m.—Meeting—Ball Room.
Warehouse Progress and Expansion.
Dollars in Packaging
Central States Chapter
12:30 p. m.—Luncheon—Dining Room.
Announcement of honorary members.
2:30 p. m.—Meeting—Ball Room.
"The Economic Outlook"—Edwin B. George, economist, Dun & Bradstreet, Inc.
"F. O. B. Pricing in Buying and Selling"—panel discussion led by A. W. Herron, Jr.
"A Competitive Free Economy and the Federal Trade Commission" — William Simon, Former General Counsel, Senate Trade Practices Committee.
7:00 p. m.—Reception—Palm Court.
Aronimink Quartet.
8:00 p. m.—Dinner—Dining Room.
Dancing and entertainment.

Net Remains Unchanged

Cleveland

• • • **Eaton Mfg. Co.** and subsidiaries report for the quarter ended Mar. 31, 1949, net profit of $2,710,024, equal to $1.51 per share on the 1,789,942 shares outstanding. Provision for taxes on income amounted to $1,964,521. Net sales for the quarter were $30,978,096.

Net profit for the quarter ended Mar. 31, 1948, was $2,746,861 or $3.08 per share on the 891,821 shares outstanding at that time. Sales for that period were $30,488,808 and provision for taxes on income $1,929,574.



the tube that helps pay for itself

IT takes 20 operations—from broaching to final milling—to make this tubular spline shaft. Cost of this machining sequence makes the finished shaft a stiff rejection risk . . . only quality seamless tubing can be used for the job. The tubing used in this particular instance, however, helps pay for itself in the bargain.

This dividend stems from a spec change, a new analysis recently adopted by the manufacturer on Frasse recommendation. Costing 10% extra, this tubing, through better machinability, *more* than earns back its slight additional cost.

Elapsed time of the cut-off operation, for instance, has been reduced from 1.03 to .948 minutes. Rough turning once took 3.0 minutes—now requires but 1.72. Broaching is now accomplished in one pass instead of the previous two. And 6.77 minutes of hobbing operation have been cut to 5.72—*with 30% longer tool life*, by the manufacturer's own estimate.

Frasse is a leading distributor of steel tubing—and provides a wide range of immediately available carbon, alloy and stainless analyses to work from. But equally available, and equally useful, are Frasse engineering facilities to help you use tubing to your best advantage. Call *Peter A. FRASSE and Co., Inc., 17 Grand St., New York 13, N. Y. (Walker 5-2200) • 3911 Wissahickon Ave., Philadelphia 29, Pa. (Baldwin 9-9900) • 50 Exchange St., Buffalo 3, N. Y. (Washington 2000) • Jersey City • Syracuse • Hartford • Rochester • Baltimore.*

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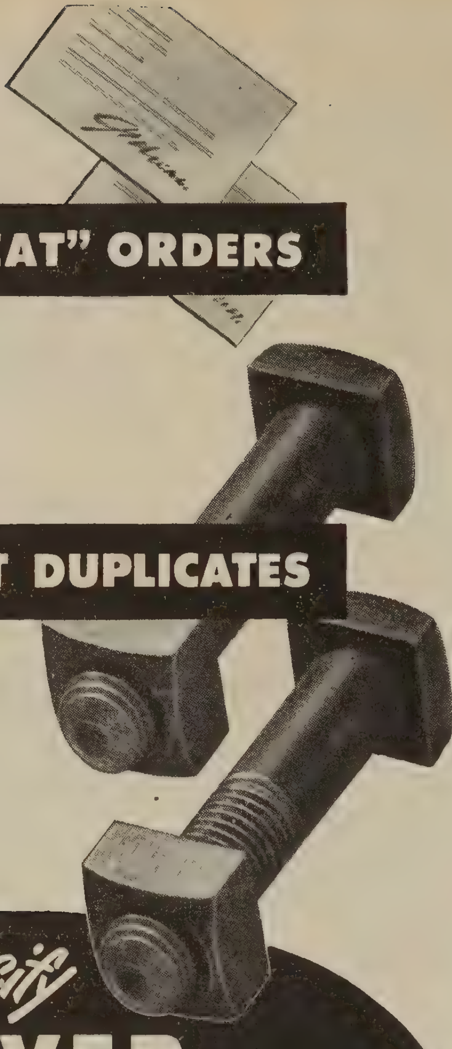

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Restrictions Eased For Private Imports Of Offgrade Pig Tin

Washington

• • • **Import licenses** for limited but unspecified amounts of offgrade pig tin (99.65 pct tin content or less) will now be granted to private purchasers under stated conditions, according to the Dept. of Commerce. No private imports of pig tin have been permitted since the early war days.

Officials of the Nonferrous Metals and Minerals Division of the Office of Domestic Commerce said that this decision will permit United States importers and tin users to take advantage of recent offerings of off-grade pig tin.

They explained that the Reconstruction Finance Corporation, which purchases all of the pig tin allocated to the United States by the Combined Tin Committee, is unwilling to accept the off-grade material.

Following are conditions under which import licenses will be granted:

(1) Material to be imported:
Pig tin containing 99.65 pct tin, or less.

(2) Import license applications must show:
Quantity of tin.
Assay or assays.
Specific U. S. customer to whom it will be sold.
Quantity to each customer.

(3) The tin may be imported only by or for customers who now receive pig tin allocations from the Dept. of Commerce.

(4) The tin will be charged against the U. S. user's allocation of pig tin in the month or quarter in which the tin is received.

(5) The tin may be used only in accordance with the provisions of Allocation Order M-43.

Import license applications (Form ODC-1041) should be addressed to Nonferrous Metals and Minerals Div., Office of Domestic Commerce, Dept. of Commerce, Washington 25, D. C.

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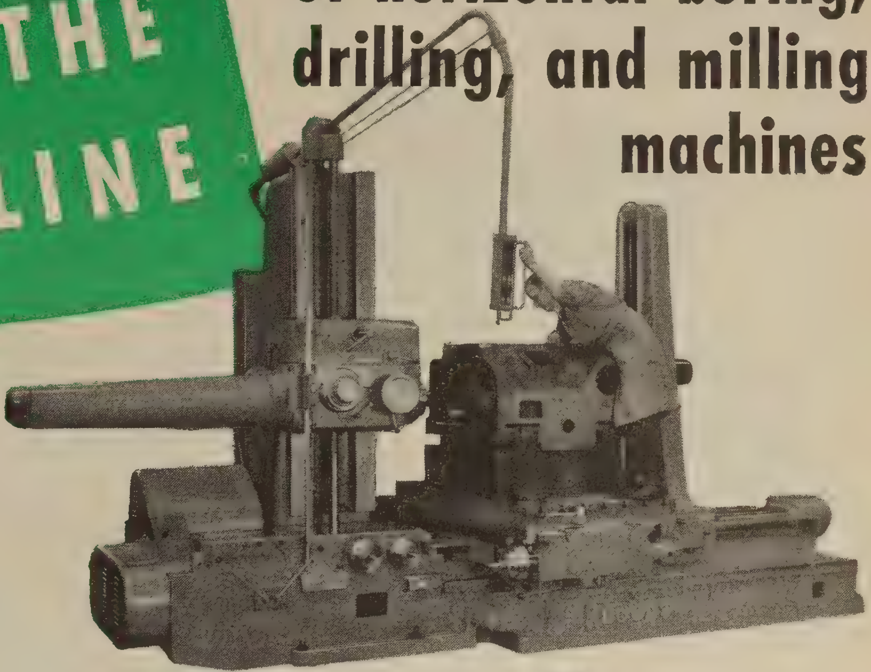
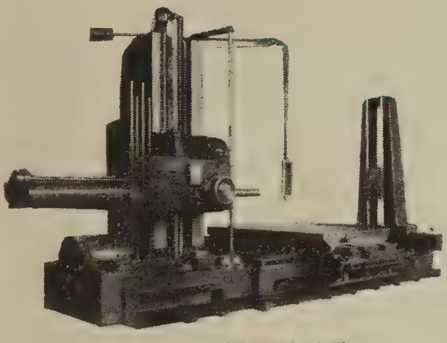
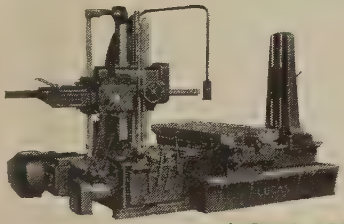


MODEL 460

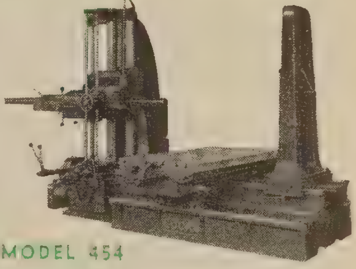


MODEL 543

MODEL 42



MODEL 348

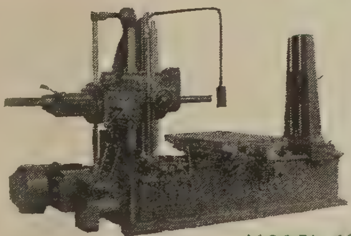


MODEL 454

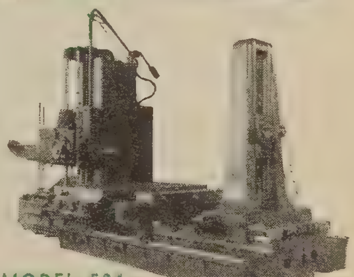
Well described as "one man machine shops", these versatile machines combine precision with ruggedness that makes them equally valuable for tool room work and as production machines.

Available with mechanical controls in 3″ and 4″ spindle capacities. Full directional remote electrical control models with 4″, 5″, and 6″ spindles. Work ranges are from 36″ x 36″ to 94″ x 84″. Two or four way beds available in all sizes.

Fine feeds, high and low speed ranges to a single spindle, accurate spacing without jigs are among the features which make all Lucas models adaptable to many kinds of work and keep them in constant productive use in any shop. *Available with automatic power positioning dial indicators for repetitive, close tolerance work.*



MODEL 41



MODEL 584

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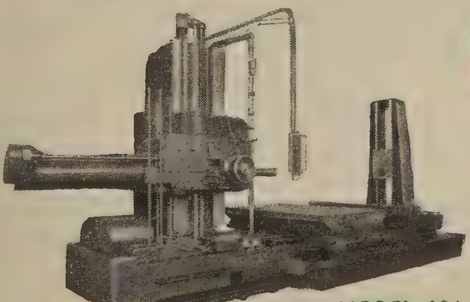
OF
CLEVELAND



MODEL 684

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HORIZONTAL BORING, DRILLING AND MILLING MACHINES
LUCAS MACHINE DIVISION, THE NEW BRITAIN MACHINE CO.
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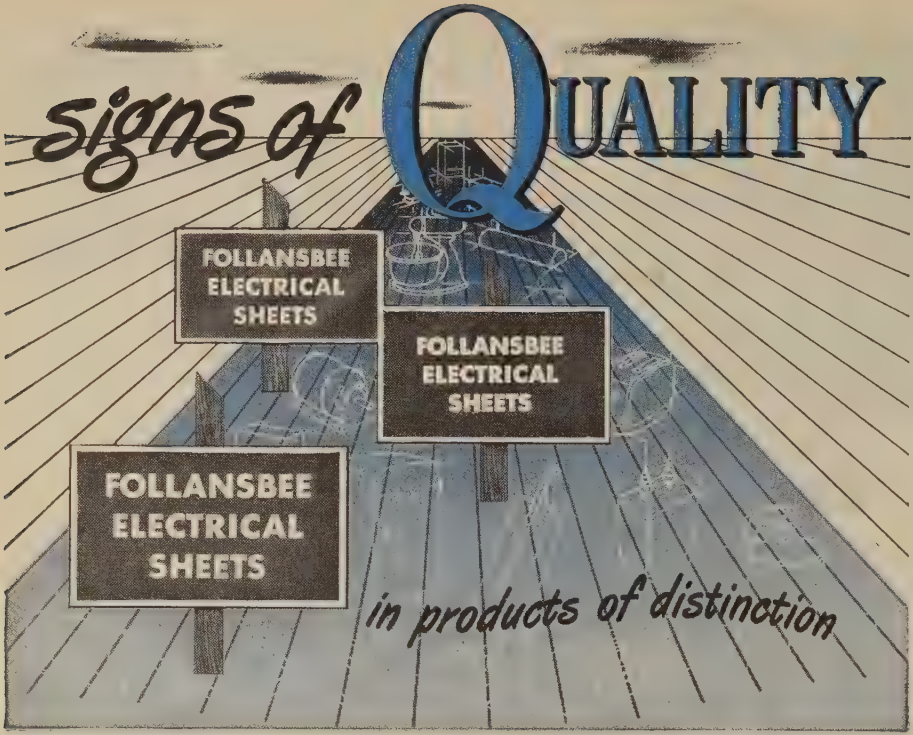
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Some ECA Buying Done By Special Missions For Governmental Use

Washington

• • • **While exports** to Europe under ECA financing are generally handled through the normal channels of trade, there are a number of exceptions where ECA buying is done by agencies of the United States or of foreign governments.

Ten of the ECA nations are represented in the United States by such missions. In some cases, a single agency handles all items; in others, several groups have been established to handle individual or general classifications of commodities.

Five countries have no such missions here. They are Ireland, Iceland, Portugal, Sweden and Switzerland.

Generally, procurement by these missions is confined largely to purchases for governmental use and the United States policy is to hold agency buying to a minimum. The ECA prefers that purchases under its authorization be made through trade channels insofar as possible.

The usual routine for those having goods to offer ECA countries is to work through regular exporters if they do not have their own representatives abroad. A list of current export firms is obtainable from field offices of the Office of International Trade, Commerce Dept.

However, for those who wish to contact foreign government missions, following is a list of such agencies currently handling metals and related products (as of Apr. 25):

FRANCE

French Steel Procurement Agency, 1761 R St., N.W., Washington, D. C., steel and ferrous metals including tinplate.

French Public Works Mission, 1761 R St., N.W., Washington, D. C., telecommunications equipment, motorized barges, cranes, spare parts (will close June 30).

French Merchant Marine Mission, 1830 18th St., N.W., Washington, D. C., ships, tankers, spare parts (also closes June 30).

Groupment for Purchase of Nonferrous Metals, 44 Beaver St., New York City, antimony, copper, lead, zinc, cadmium, bismuth, tin, aluminum, copper alloys.

French Coal Purchasing Association, 1520 New Hampshire Ave., N.W., Washington, D. C., coal and coal tar pitch.

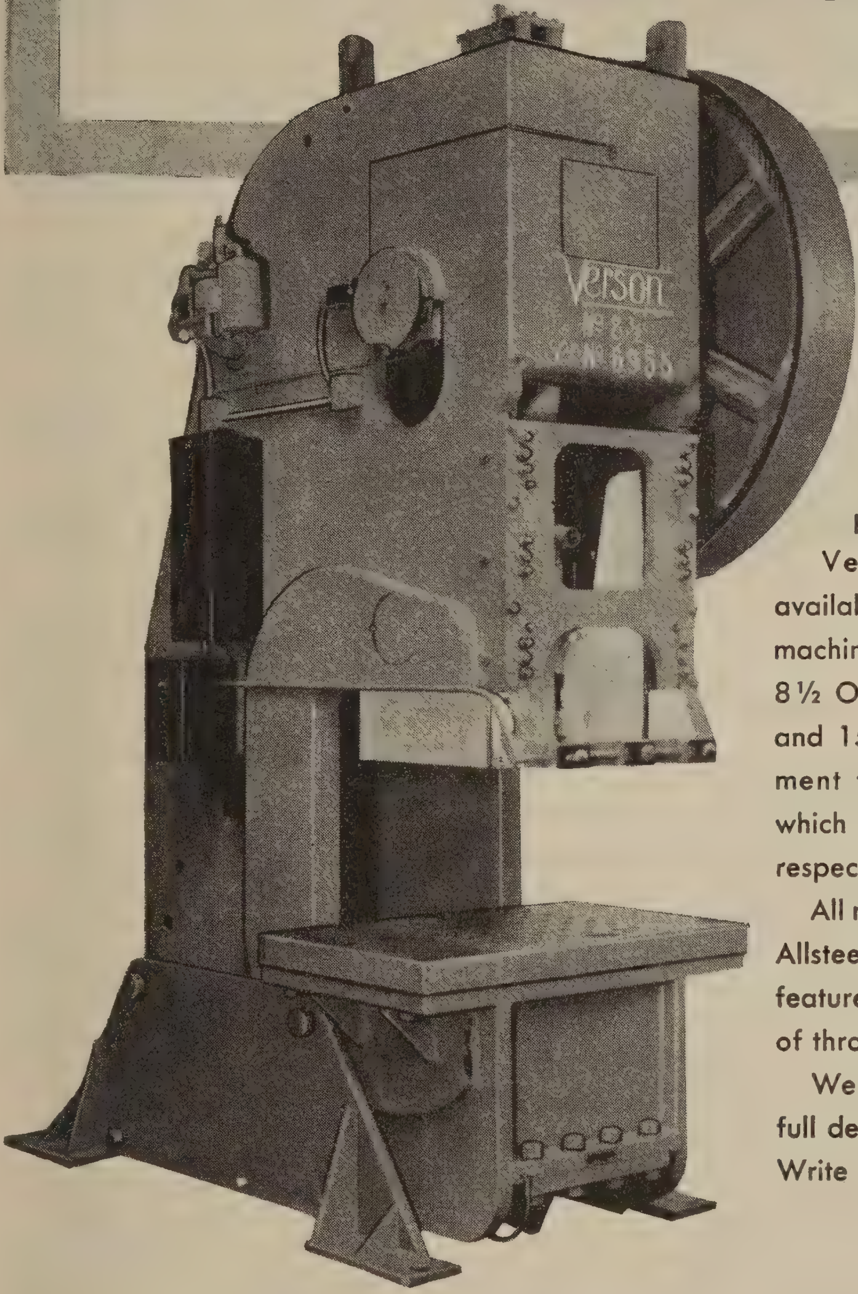
French Office of Power Stations, 1322 18th St., N.W., Washington, D. C., general construction equipment, power plants and electrical material, spare parts.

French Mining Equipment Purchasing Office, 1322 18th St., N.W., Washington, D. C., mining equipment.

Air France, 683 Fifth Ave., New York City, planes and air navigation equipment, spare parts.

French National Railways, 1759 R St., N.W.,

NOW you can have the advantages of Verson O.B.I. PRESSES in a broader range of sizes . . .



Now the versatility, dependability and economy of Verson O. B. I. Presses are available to users requiring heavier machines. The Verson Nos. 8 and 8½ O. B. I. Presses are rated at 125 and 150 tons respectively and augment the Verson Nos. 7 and 7½ which are rated at 90 and 105 tons respectively.

All models offer the famous Verson Allsteel Frame and such additional features as liberal stroke length, depth of throat and slide and bed area.

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Noblewest automatic numbering heads are the product of long experience and guaranteed to be the finest obtainable. Produced from specially selected steel, each part is precision made by master craftsmen in a plant equipped with every modern facility. Such standards of quality pay dividends in long service and precision numbering to every user. Standard models are available in any size numbers from 1/40″ to 1/2″. Special numbering heads are made to any requirements including embossing heads, and numbering heads combined with dies. For complete specifications, prices and other details write to NOBLE & WESTBROOK MANUFACTURING CO., 22 Westbrook St., East Hartford 8, Connecticut.

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NOBLEWEST
EQUIPMENT FOR MARKING · GRADUATING · EMBOSSING · NUMBERING

Washington, D. C., railroad equipment and spare parts, (both France and North Africa).

French Office for Purchase of Well Drilling Equipment, 44 Beaver St., New York City, drilling equipment and parts.

UNITED KINGDOM

British Iron & Steel Corp., 43 Exchange Place, New York City, iron and steel.

(Aluminum, copper, lead, zinc, etc., purchased by the British Nonferrous Metals Directorate, Shellmex House, London. Other missions in United States concerned largely with buying non-metal goods only.)

BELGIUM-LUXEMBOURG

Belgian Economic Mission, 1780 Massachusetts Ave., N.W., Washington, D. C., tinplate, radioisotopes, etc.

BIZONE GERMANY

Joint Export-Import Agency, APC 757, c/o Postmaster, New York City. Procurement functions being reduced.

FRENCH ZONE GERMANY

Joint Export-Import Agency, Hotel Baeren, Lichetenthal, Baden-Baden, Germany.

GREECE

Greek Ministry of Supply, Athens, Greece, conducts bidding and awarding of contracts.

ITALY

Italian Coal Procurement Agency, 1424 K St., N.W., Washington, D. C., coal for both governmental and civilian use.

TURKEY

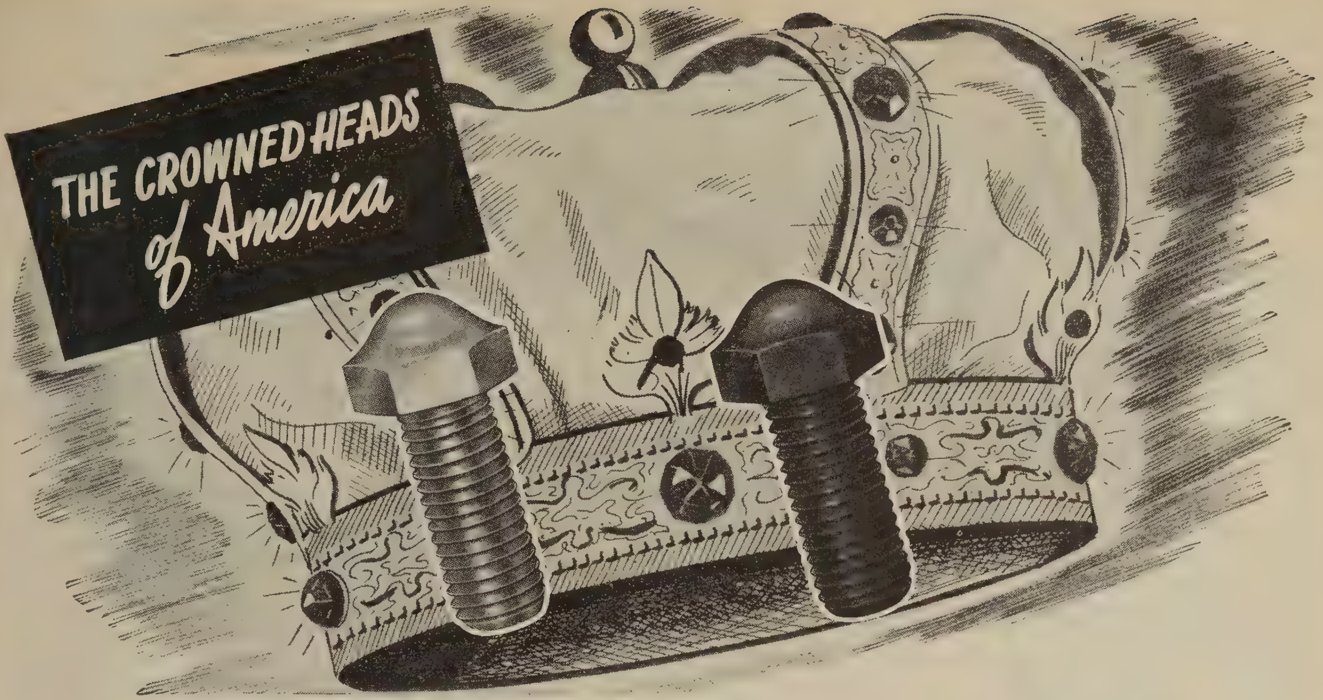
Turkish Economic Mission, 1700 Webster St., N.W., Washington, D. C., purchases material for industrial and mining program.

Welcomes Buyer's Market

Peoria

• • • **Caterpillar Tractor** Co. recently unveiled its newly completed diesel engine plant, which covers 21 acres and is part of a $55 million expansion program. Louis B. Neumiller, president, told a news conference that he believes this year will be the best in the company's peacetime history despite the return of a buyer's market. He admitted that the salesmen now have to go out and sell engines because Caterpillar can make more engines than they have been selling but he added, "We welcome the return of a buyer's market with open arms." The return of competition will restore a normal and healthy market and will result in better products at lower prices.

Caterpillar manufactures tractors, road maintenance equipment, earth movers, and diesel engines for many industrial uses. Mr. Neumiller pointed out that the backlog of several billions of dollars of public works was a prime market for the company's products. He also predicted a strong foreign demand for his company's products resulting from the missionary work done by Caterpillar products used all over the world during World War II.



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A Crowning Achievement in Cap Screw Design

FOR GENERAL USE

SHINYCROWNS give that "New Look" to assembly where appearance, ultra-quality, and sales interest are paramount. For that "finishing touch" to your assembly, specify SHINYCROWNS, the last word in ornamental Hexagon Head design.

SHINYCROWNS are furnished in C-1018 steel, in sizes ¼" diameter through ½" diameter inclusive, in both coarse and fine threads, in plain, zinc, cadmium, nickel, or chrome plate. Price governed by quantity desired—bulk shipments only.

SPECIAL NOTE: Also furnished with polished crown to secure highest possible luster, mirror finish.

FOR SPECIAL USE

SHINYCROWNS - HexHard have that "New Look" appearance with the added features of hard Hexagon Heads and soft, tough threads obtained by a special heat treatment—for use where tightening and loosening for adjustment purposes is necessary.

SHINYCROWNS - HexHard are furnished in special heat treating material to secure the above features, in standard sizes ¼" diameter through ½" diameter inclusive, in both coarse and fine threads, in plain, zinc, cadmium, nickel, or chrome plate. Price governed by quantity desired — bulk shipments only.

SPECIAL NOTE: Also furnished in ⅜" diameter special 20 thread where specified.

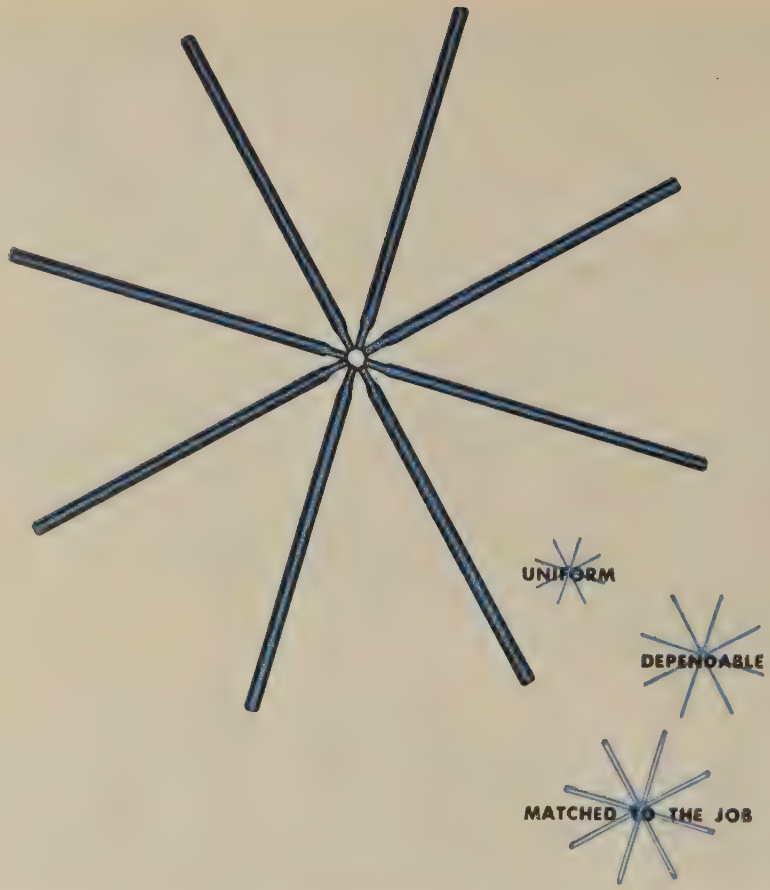
SHINYCROWNS - HexHard with hard Hexagon Heads are recommended to eliminate poor wrench fit resulting in rounded corners from constant adjustment.

Complete Information and Samples furnished on request.

The FERRY CAP & SET SCREW Co.
2157 SCRANTON ROAD • • • • • CLEVELAND 13, OHIO

Pioneers and Recognized Specialists Cold Upset Screw Products since 1907

CAP AND SET SCREWS • CONNECTING ROD BOLTS • MAIN BEARING BOLTS • SPRING BOLTS AND SHACKLE BOLTS • HARDENED AND GROUND BOLTS
SPECIAL ALLOY STEEL SCREWS • VALVE TAPPET ADJUSTING SCREWS • AIRCRAFT ENGINE STUDS • ALLOY STEEL AND COMMERCIAL STUDS • FERRY PATENTED ACORN NUTS



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GENEX—for all-position work and bridging gaps.

TYPE FHP & TYPE F—for high speed, highest quality positioned work.

TYPE R—for sound weld metal on jobs involving vertical and overhead welding.

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M & T products include M & T's "Select 70" group of electrodes. M & T AC and DC welding machines and M & T welding accessories. The line is complete, providing everything needed for arc welding . . . arc welding of top-notch quality. Write today for descriptive data.

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CHICAGO NEWARK CINCINNATI PHILADELPHIA CLEVELAND PITTSBURGH HOUSTON SO. SAN FRANCISCO MINNEAPOLIS TORONTO

Record Expenditures On Steel Expansion Provides 50,000 Jobs

New York

• • • **Expenditure of more** than half a billion dollars a year by iron and steel producers for new plants and equipment is one of the strong forces contributing to the record-breaking level of civilian employment in the postwar period, according to American Iron & Steel Institute.

The $583 million spent by the industry last year was more than three times the annual 1935-39 average. After allowing for the increased cost of equipment, approximately double the prewar level, the physical volume of work was greater, requiring increased employment on plant construction and in equipment factories.

This year the planned expenditure of $627 million by the iron and steel companies for new plants and equipment will give a larger volume of purchasing power to workers and contractors than ever before. It is estimated that steel producers' improvement and expansion expenditures last year gave employment to nearly 50,000 persons in construction and in factories making equipment, or approximately the size of employment in the machine tool industry.

In addition to those employed directly on these projects, many others are employed in such supporting industries as raw materials and transportation.

No Increase in Net

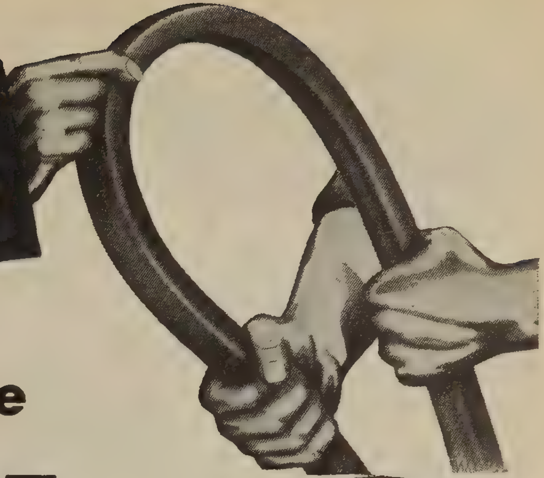
Chicago

• • • **Earnings** of Standard Forgings Corp. for the first quarter of 1949, after federal taxes at current rates, totaled $247,035, equivalent to 93¢ a share on 266,000 shares of $1 par value common stock outstanding, compared with earnings of $253,903 or 95¢ a share for the corresponding period of 1948, according to Roy W. Clansky, president, at the annual stockholders meeting.

Shipments for the quarter ended Mar. 31, 1949, he said, totaled $4,146,000, compared with shipments for the corresponding 1948 quarter of $3,608,000.

At the annual meeting, all officers and directors were re-elected.

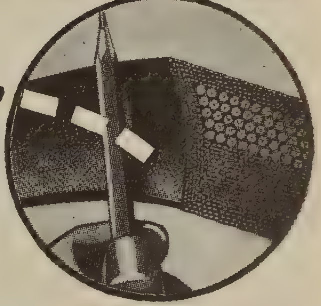
Make this Test with ANY V-Belt



You'll See at Once Why the

CONCAVE SIDE

(U.S. Patent No. 1813698)



Saves You Money!

Bend any V-Belt and feel the sides change shape. The top of the belt, under tension, *narrows.* The body, under compression, *widens.* The sides of the belt bulge out.

The result, if the belt is built with *straight sides,* is a shape that does not fit the sheave groove—as shown in Figures 1 and 1A, below.

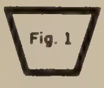


Fig. 1

Straight-Sided V-Belt

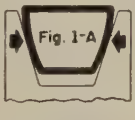


Fig. 1-A

How Straight-Sided V-Belt Bulges in Sheave-Groove

Clearly, the bulging of the sides will produce excessive wear along the *middle* of the sidewall as indicated by arrows.

Now, bend a V-belt with the *concave* side—the Gates Vulco Rope.

You get the same shape change but *now* the new shape exactly fits the sheave groove—as shown in Figures 2 and 2A.

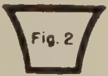


Fig. 2

Gates Vulco Rope with Concave Side.

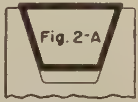
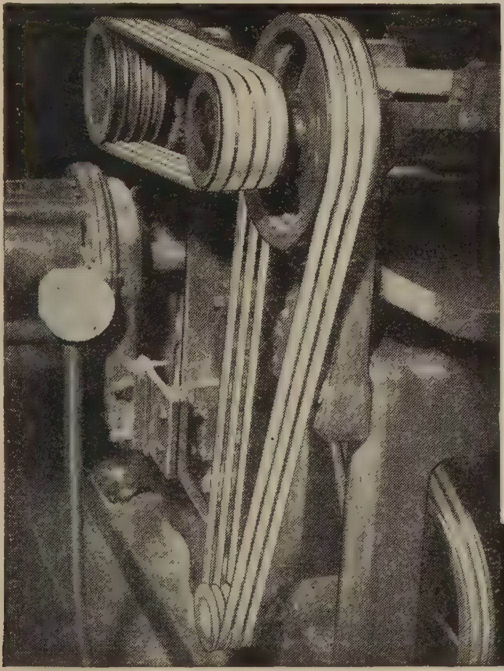


Fig. 2-A

No Side Bulge. Precise Fit in Sheave-Groove.

Results? (1) *Uniform* sidewall wear; *longer life!* (2) Full sidewall grip on the pulley. Carries heavier loads and *sudden load increases* without slippage; saves *belts* and also saves *power!*



The Concave Side is *MORE IMPORTANT* NOW Than Ever Before

Because the *sides* of a V-Belt are what actually *drive* the pulley, it is clear that any increased load on the belt means a heavier load that must be transmitted to the pulley *directly* through the belt's sidewalls.

Now that Gates *SPECIALIZED* Research has made available to you SUPER Vulco Ropes—carrying fully 40% higher horsepower ratings—the life-prolonging Concave Side is naturally more important in conserving belt life today than ever before.

THE GATES RUBBER COMPANY
DENVER, U.S.A.
The World's Largest Makers of V-Belts

Gates
REG. U. S. PAT. OFF.
The Mark of SPECIALIZED Research

494

GATES VULCO ROPE DRIVES

Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

Can your Spring Coiler make this?
TAPERED SPRING
with the end across the center

Crack tough production problems faster with a
TORRINGTON SPRING COILER

Ever see a Torrington Spring Coiler go to work? The way these versatile machines tackle the toughest kind of spring assignments is *practically human!* You just cant beat 'em for *speed, accuracy* and *economy!* That's why professional springmakers everywhere turn to Torrington for quick answers to their springmaking problems.

The tapered spring with the end across the center (shown above) is typical of the exacting work you can produce with Torrington Spring Coilers. Why not write our Sales Department for the details on this particular spring job, or any special problem you may have!

Torrington's W-11 Spring Coiler

The TORRINGTON
MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT

BM Reports Deposits Of Chromite Ore And Asbestos in Alaska

Washington

• • • **Analysis of ore samples** from the Kenai Peninsula, Alaska, has indicated that low grade chromite ore from the Claim Point deposits could be treated to produce high grade concentrates.

In a report of investigations which began in 1941, the Bureau of Mines says that the best results yielded concentrates containing from 45 to 53 pct chromite with recovery ranging from 82 to 89 pct.

In another report, the Bureau says it now has analyzed the results of tests for asbestos deposits in Kobuff district, also Alaska, found along both the Shungnak river and Dahl creek.

Recovery from the samples is so low, the Bureau reports, that the deposits are unsuitable for spinnable asbestos such as used for cable or safety clothing. However, it adds, it probably can be used to make such items as shingles or filter mediums.

United Has Good Backlog

Pittsburgh

• • • **United Engineering** & Foundry Co. is assured of a high level of operations continuing "beyond the present calendar year." F. C. Biggert, Jr., chairman, gave this news to stockholders at their annual meeting here last week. Although backlogs were not as good as they were at the beginning of 1948, he said they were sufficient to assure "highly satisfactory" operations beyond 1949.

He explained that while there is now some hesitancy on the part of customers in making definite commitments against future construction, it is believed that favorable Congressional action on taxes and labor will release a pent-up demand for United Engineering products here at home.

"In addition," he said, "we expect a substantial volume of foreign sales during the current year. "United is pushing development work on continuous annealing of ferrous and nonferrous strip, mechanical scale breakers, flying shears and similar equipment.

Develops New Gas Engine With 52 Pct Greater Efficiency

Mt. Vernon, Ohio

• • • **Development** of a supercharged gas engine claimed to have at least 52 pct higher efficiency than ordinary gas or gasoline engines, was announced last week by Gordon Lefebvre, president of Cooper-Bessemer Corp.

"This remarkable efficiency," he said, "is the result of introducing some of the combustion features of our gas-diesel engines into spark-ignited gas engine design, accompanied by supercharging—the first time supercharging has ever been applied to four-cycle gas engines.

"It makes possible a full 80 pct jump in horsepower for the same size engine while reducing fuel consumption by at least 30 pct.

"This new engine has been on test since last October" Mr. Lefebvre revealed, "and although we set out to greatly reduce the cost of power in municipal, industrial and R.E.A. plants, wherever natural gas is available, it soon became evident that the development has much broader application—that it might even be used to greatly extend the flight range of aircraft."

Mr. Lefebvre explained that butane-propane fuels (oil, gas or coal hydrocarbons) which can be readily stored or carried in liquid form, have approximately the same Btu content as gasoline, and can be fed to engines as a gas. Thus the new engine principle, with at least 52 pct higher efficiency than today's aircraft engines, offers the possibility of greatly increased flight range. He said the most immediate application is for stationary power in areas now using natural gas.

The new supercharged gas engine, having successfully completed all tests, is now ready for extensive field application and will be in regular production by mid-year.

Salvage Proves Profitable

Seattle

• • • Salvage operations proved a big money saver to Boeing Airplane Co. plant here.

In the first 3 months of 1949, Boeing reclaimed and shipped out 718,045 lb of aluminum scrap; more than a million lb of steel scrap; 24,769 lb of lead alloy scrap and 20,988 lb of zinc dross.

TORRINGTON'S
NEW, HIGH SPEED
TUBE & ROD STRAIGHTENER

ON THE JOB IN RHODE ISLAND!
Over 60 years of Torrington knowledge and skill went into the development and manufacture of this Tube & Rod Straightener!

Equipped with Roller Bearings Throughout!

★ **All rolls driven and overhung for quick changing!**
★ **Universal joint drives to all adjustable rolls!**
★ **All gearing totally enclosed and running in oil!**

These multi-roll two plane straightening machines are designed for the commercial straightening of rod and tubing in round, hexagon, square and rectangular sections by passing it through rolls which are located half in horizontal plane and half in vertical plane in staggered arrangement.

Each machine is a self contained unit, mounted on a substantial base. The motor is strategically located for convenient inspection, maintenance and conservation of floor space.

Designs include machines with 12 and 24 rolls which will straighten material of uniform cross section and temper.

Call or write Torrington today for more information and name of nearest Torrington representative.

The TORRINGTON
MANUFACTURING COMPANY TORRINGTON, CONNECTICUT

DESIGNERS AND BUILDERS OF MILL MACHINERY FOR OVER 60 YEARS

U. S. Consumes 74 Pct of World Nickel; Precious Metals Losses Cut in Production

Toronto

• • • **More than 40 pct** of the total nickel consumption by United States steel producers in 1948 was in the form of nickel oxide sinter, it was revealed by Robert C. Stanley, chairman, the International Nickel Co. of Canada, Ltd., at the annual meeting last week.

To conserve losses of precious metals in the production of sinter, a plant has been built for the separation of copper, nickel and platinum metals in matte by subjecting the matte to controlled cooling, flotation and magnetic separation. Matte flotation operations are approaching full-scale production. Sintering operations are soon to be transferred from Port Colborne to Copper Cliff, Ont.

The early application of nickel oxide sinter was confined to stainless steel production. But its use has been extended to openhearth and electric furnace alloy steels. More than 80 million lb of nickel was consumed by the United States, Great Britain and Canada for wrought steels in 1948. The bulk of this tonnage was consumed in the United States, an indication of the heavy rate of sinter production.

Cobalt recovery at Port Colborne is now at the rate of 15 tons in the form of oxide monthly. Increased production is under consideration. A large portion of the cobalt produced at the company's Clydach, Wales plant is in the form of salts.

World sales of nickel in 1948 were 240,098,274, up 35 million lb from sales in 1947. Over 90 pct of the total was consumed by the United States, Britain and Canada. Sales to U. S. consumers totaled 177 million lb.

It has been necessary for the company to mine lower grade ores. Nickel recovered per ton of ore dropped to 27 lb from recovery in 1938 of 45 lb. Geological exploration is being intensified in Canada and throughout the world. During the past few years the company has been investigating an ore deposit in Venezuela, in the provinces of Miranda and Aragua. Claims have also been staked in the Lynn Lake and other areas in Manitoba. The company's proven ore reserves at the end of December stood at 246,177,000 net tons, as compared with 221,843,000 tons a year previously.

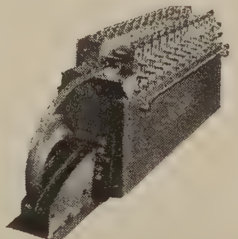
Progress has been made in the flash smelting of nickel and copper flotation concentrates with oxygen. Results indicated in pilot plant operations have been satisfactory enough to warrant the construction of an oxygen plant and an initial flash smelting furnace on a commercial scale. The new process permits a considerable saving in coal, and will increase the production of sulfuric acid and permit the production of liquid sulfur dioxide from furnace exhaust gases.

Refined copper sales by the company in 1948 totaled 109,565 net tons, about the same as in 1947. Sales of copper in Canada totaled 57,500 net tons, a tonnage 90 pct greater than before the war. Some copper was sold in the United States.

Total sales of the platinum group metals in the United States in 1948 are estimated at 350,000 oz, about 37,000 oz lower than the previous year.

Sales of selenium in 1948 were 103,687 lb, less than 50 pct of 1947. Sales of tellurium were 12,608 lb, compared with 16,420 lb in 1947. Sales of gold by the company totaled 38,087 oz. Silver sales were 1,320,754 oz.

The alloy steel production of the United States, Canada and Great Britain in 1948 was approximately 9 million ingot tons, of which about 40 pct is reported to have contained nickel. Total production of stainless steel by the three countries was about 700,000 ingot tons. With about two-thirds of this volume in the chromium-nickel grades, a demand in excess of 40 million lb of nickel was created,



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Continuous precision and quality of cold rolled products depends upon your roller dies!

With correctly designed ARDCOR Roller Dies, made of highest grade tool steel, maximum production speeds are assured . . . better products obtained.

ARDCOR Craftsmen have the ability to serve, the experience to guide and the facilities to produce.

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AMERICAN ROLLER DIE CORPORATION

20650 St. Clair Ave. CLEVELAND 17, OHIO

Slowdown Hits Active Shipbuilding Center

Terminal Island, Calif.

• • • Softening scrap markets, cuts in government appropriations and the high cost of labor are combining to make this island, once the hub of southern California ship building, return to its prewar sleepy pace.

Before the war, Terminal Island, which is in the heart of Los Angeles harbor midway between San Pedro and Long Beach, had a few shipbuilding activities but was noted mostly for its Japanese fishing village and small boat harbor.

During the national crisis and later war, the Japanese were evacuated and the island became the largest concentrated ship building center in southern California. Hundreds of thousands of men crowded over the drawbridges to work every day.

The Navy occupied one entire side of the island with a teeming shipyard, sprawling training base and disciplinary barracks. At one end, Bethlehem Steel Co. enlarged its ship repair facilities and began the construction of destroyers. California Shipbuilding Co. was organized and covered many acres turning out scores of cargo ships.

Since the war some hope has been held that this area would remain an industrial center but gradual decreasing waterfront activity is becoming more apparent almost weekly as Terminal Island slowly gives more importance to fishing and less to ship repair and building.

Latest slowdowns have been effected by National Metal & Steel Corp., the largest shipbreaking company in the harbor area.

Still tied to the company docks are numerous partly dismantled ships, ranging from ex-destroyers to smaller craft but recent drops in prices and demand from the mills have been reflected in the slowing down of activities of the shipbreakers. On average ships, this yard, when working in a demanding market, turns out about 2000 tons a week. The amount now varies as mills use up large inventories. Nonferrous demands have dropped also.

Despite an influx of scrap from Pacific islands, however, officials

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SAVE COOLING WATER

Get Many Other Benefits and Cost Savings

• Niagara Aero Heat Exchangers provide faster and more accurate cooling to specified temperatures for liquids in many industrial processes. They help lower production costs.

Cooling by the evaporative principle, they transfer heat to air, which is easily disposed of, and consume less than 5% of water used in conventional cooling methods. A Niagara Aero Heat Exchanger replaces both shell-and-tube cooler and cooling tower, and saves piping and pumping. Its savings quickly return its cost.

It helps improve the quality of production by removing heat at the rate of in-put, and by greater accuracy of control. For example, as applied to heat-treat quenching or to a chemical process cooling, provision for heating as well as cooling saves the time and prevents the product losses of a "warm-up" period.

Successful applications also include control of temperatures for jacket coolants for engines, hydraulic equipment, transformers and electronic sets, and special industrial equipment.

Write for Bulletin No. 96

NIAGARA BLOWER COMPANY
Over 35 Years of Service in Industrial Air Engineering
Dept. IA. 405 Lexington Ave., New York 17, N. Y.
District Engineers in Principal Cities

INDUSTRIAL COOLING • HEATING • DRYING
NIAGARA
HUMIDIFYING • AIR ENGINEERING EQUIPMENT

of the company said they believe they can remain in the competitive market at the lower prices now effected.

Even the Navy has slowed down activity as announced in THE IRON AGE recently with 1300 men scheduled to be laid off to bring the civilian complement down to 6300. The Navy has three giant drydocks, one large enough to take a modern battlewagon. Most of the ships in these docks now, however, are undergoing emergency repairs or being prepared for summer Naval Reserve cruises. There is a continual process under way of preserving hundreds of ships in the "mothball" fleet tied up here.

The Bethlehem shipyard is the oldest on the island. It was established in the first world war and taken over by Bethlehem shortly thereafter, turning out a few freighters and several barges. During peacetime it was used for ship repair. During World War II it turned out 26 destroyers, an Army hospital ship and worked on many ship conversion projects.

Shipbuilding was abandoned by the company at the close of the war and high labor rates for the area now are limiting much of the ship repair work traditionally carried on by Bethlehem, which does both engineering repairs and hull work. Emergency repairs form much of the work with many ships going further north to British Columbia for repairs not requiring a rush job.

The largest amounts of steel arriving on the island are being shipped by Consolidated-Western Steel Corp., which is sending its 24, 30 and 31-in. steel tubing to the yards of the Crescent Wharf & Warehouse Co. awaiting shipment to Arabia by the Isthmian Steamship Co. Last week, 8272 units totaling 24,734.9 tons of 30 and 31-in. pipe and 2549 sections of 24-in. pipe totaling 3886.9 tons awaited shipment.

Mechanization Needs Rise in Materials Handling Problems

New York

• • • **The need** to make a usable product out of low-grade iron ores is creating a new ore processing industry which will require handling and processing equipment of new design and startling potentialities, according to a materials handling expert.

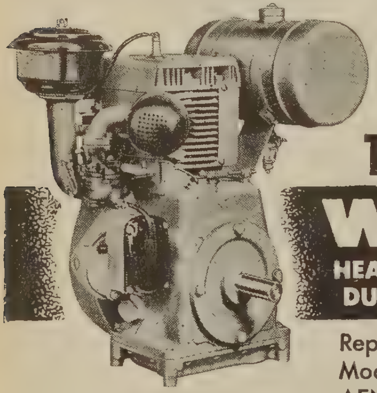
Harold Von Thaden, vice-president and general manager of the Robins Engineers Div. of Hewitt-Robins Inc., predicted that because of new materials handling problems in iron ore, as well as in coal production, "the belt conveyor and related heavy conveying techniques will undergo their greatest technical development in history in the next 10 years. The conveyor era is just unfolding and its possibilities are unlimited."

Addressing the 4th Annual Time Study and Methods Conference sponsored by Society for Advancement of Management and Management Div. of the American Society of Mechanical Engineers, Von Thaden stated that the gradual shift from the diminishing sources of rich ore to lower grade ores means that four times as much material must be processed to get a usable product.

"If we are to protect our domestic sources of iron ore (by processing the lower grade ores), provide the fuel for the rapidly-rising electrical power requirements, and, on top of this, produce synthetic fuels from coal, we will have to prepare to recover 400 million more tons of iron ore annually, and better than 250 million more tons of coal every year," he said. "This presents a staggering problem in bulk materials handling in the next 10 years."

He said that mechanization in American coal mines was proceeding at a rapid pace and cited one mine in Illinois which had increased its production to 32 tons per man day, five times our national average and almost 25 times the average production in England.

As for strip mining, he said that to achieve continuous flow from digging to dumping of over-burden (earth, rock, trees, etc.) "we must have bigger rock crushers, extendable belt conveyors and continuous diggers. Some of these devices are now being tested. We will have all of them within a few years."



20% Increase in H. P.
15% Decrease in weight
That's the *New* MODEL AEN
WISCONSIN
HEAVY-DUTY *Air-Cooled* ENGINE!

Replacing the universally popular Wisconsin Model AEH Air-Cooled Engine, the new Model AEN turns up 7.5 H.P. at 3,000 R.P.M. as against 6.1 H.P. at 3,200 R.P.M. delivered by the engine it replaces. Weight: 110 lbs., as against 130 lbs. for the AEH.

All this has been accomplished without sacrificing heavy-duty crankshaft capacity or any of the traditional Wisconsin features such as: Tapered roller bearings at *both* ends of the drop-forged crankshaft; oil pump and spray lubrication; weather-sealed high tension outside magneto with impulse coupling for quick starting and dependable ignition in any climate, in any weather; flywheel-fan air-cooling — extremely efficient at all temperatures from sub-zero to 140°F.

The Model AEN represents a major achievement in the design and construction of a light weight heavy-duty power unit for all-purpose power applications. Write for Bulletin S-109.

The Wisconsin line includes 4-cycle single cylinder, 2- and 4-cylinder models in a complete power range from 2 to 30 H.P.

MOST H.P. HOURS
WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 14, WISCONSIN

Coordinates Research in New Central Division

Cleveland

G. H. McIntyre

• • • **Formation** of a central research division within the framework of the Cleveland organization to coordinate all corporate research activities of Ferro Enamel Corp. was recently announced by C. D. Clawson, Ferro president.

The new division will be headed by Dr. G. H. McIntyre, vice-president and director of research.

Dr. McIntyre said the new grouping will definitely strengthen Ferro's research program. "Central research includes a patent division, a market research division and process and product evaluation division. Among the projects currently under consideration are programs of cost evaluation and a government research contract for the chemical corps," he added.

Personnel of the ceramic division of central research will be housed in a new laboratory which will be ready for occupancy May 1. The laboratory increases to ten the number of research laboratories operated by Ferro.

Brake Shoe Earnings Up

New York

• • • **American Brake Shoe** Co. sales amounted to $29,957,451 during the quarter which ended Mar. 31, William B. Given, Jr., president, reported to stockholders at the annual meeting here. Sales in the first quarter of 1948 amounted to $28,525,637. Over 75 pct of the common and preferred stock outstanding was represented at the meeting.

Net income for the first quarter amounted to $1,466,722 which was equal to $1.28 a common share, after preferred dividends. Net income for the first quarter in 1948 was $976,006 which was equal to 78¢ a common share. For the past quarter, the rate of 4.9¢ earned on the sales dollar compared with a rate of 3.4¢ in the first quarter of 1948 and 4.3¢ for the entire year of 1948.

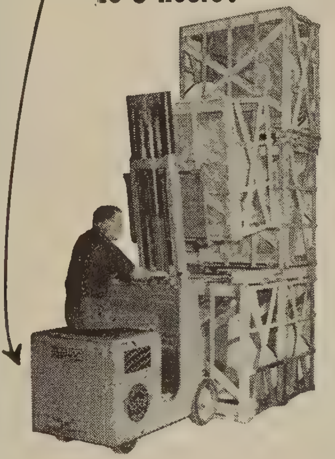
Can you
MATCH THESE SAVINGS
in your Plant?

With BAKER TRUCKS

1 to 1½ hour job costing $25 per hour — cut to 15 minutes!

Loading a 50 KW transformer onto a highway truck formerly took a crew of linemen 1 to 1½ hours at an estimated cost of $25 per hour. On its first day of service, the Baker FQH (low-cost, light-weight) Fork Truck, with one operator, did the job in 15 minutes.

8 hour unloading job cut to 3 hours!



The same Baker Truck unloaded and tiered a car of 74 crated electric appliances, weighing 275 lbs. each, in 3 hours. This job formerly took 3 men 8 hours.

Typical of the savings possible with a low-cost, light-weight BAKER FQH Fork Truck are these made by a prominent Southern utility. In addition to the operations illustrated, the truck is used for unloading, warehouse handling and loading of a complete line of major appliances, coils of wire, insulators, pole line hardware, etc. The truck will also be used for handling transformers between the warehouse and a transformer storage and testing shop to be erected. It is estimated that this truck will pay for itself in savings within 18 months.

Wherever space is at a premium and loads vary from 100 to 1500 lbs.,* the Baker FQH Fork Truck is the ideal handling unit. Its low-cost, light-weight and extreme maneuverability permit its use for many applications where heavier, costlier equipment is impracticable. Write for complete information, or contact your nearest Baker representative.

*Up to 2000 lbs. with the Baker FRH

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In Canada: Railway & Power Engineering Corp., Ltd.

Baker INDUSTRIAL TRUCKS

Invest
ZERO For Equipment
For Raw Material

You Can Lease
Air Products Generators
and make your own

BY THE CUBIC FOOT
OXYGEN
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The raw material, air, is free. You invest nothing for equipment. You'll find operation of Air Products generators is simple and requires little time; that the rental is fair and the advantages many:

- You avoid delivery failures.
- You eliminate the expense of handling, delivery and evaporation loss—a large percentage of the cost to oxygen users.
- You assure your supply at low cost.

These same generators also produce high-quality nitrogen gas.

If you use 200,000 cubic feet of oxygen per month or more, it will be of great advantage to you to make your own with Air Products generators.

HOW TO CASH-IN
ON THIS TESTED PLAN

Let us know how much oxygen you use per month, minimum and peak demands; whether you own a pipe line and storage bank, and any other pertinent information. We will show you how to improve your oxygen service at very substantial savings, as many other firms have done.

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Allentown, Pa.

Assure Your Supply at low cost with
Air Products
OXYGEN GENERATORS

NME Issues Additional Rules for Renegotiation

Washington

• • • **Additional rules** to be followed by the armed services in renegotiation of contracts, aimed specifically toward recapturing excessive profits, have been issued by the National Military Establishment.

In addition to aircraft and parts, several other types of contracts are covered by the new rules issued in Part 424, "Determination and Elimination of Excessive Profits." They were published in the Federal Register of Apr. 13, 1949, which may be obtained from the Government Printing Office.

Principal features of the new part specify that:

Amount of excessive profit is to be determined before income taxes; special attention be directed to cost-plus and incentive contracts; settlements made during war years will have no bearing on those governed by the 1948 Act; excess profits will not be allowed because of lack of working capital; decisions will be made on an individual basis rather than formula.

They also provide that contractors arriving at lower costs because of good management and improved productivity will be allowed a larger profit. Also, the amount of risk assumed as to increased material cost, delays in getting material, wage increases and so on will be taken into account by renegotiators.

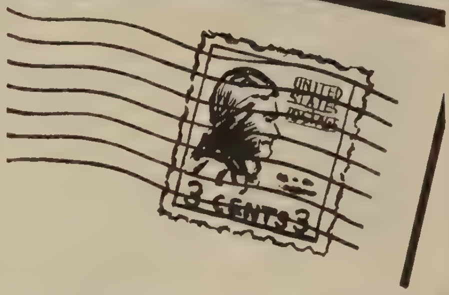
Allocates $20 Million For Mineral Development

Washington

• • • **Allocation** has been made for use of $20 million (5 billion francs) in French counterpart funds in exploring and developing raw material sources in France and her overseas territories.

Approximately $10 million will go for mineral prospecting and research while $6 million will be invested in basic mining and related development including roads and other handling facilities. Some $3 million will be loaned to private firms for increasing production of critical minerals.

Are you willing to gamble a 3¢ stamp



on lower unit costs for your product?

• JUST an ordinary 3c stamp may open the way to substantial savings for you—if you use it to send us an outline of your spring requirements. As they often have in the past, our skilled springmakers and practical, experienced engineers may be able to show you how you can reduce your spring costs and perhaps even make it possible to simplify assembly of your product. Accurate's unexcelled facilities and springmaking "know-how" are your best bet for the right spring for your job at the lowest overall cost. And we're prepared to show you the "proof of the pudding."

The sooner you "risk" that 3c stamp the sooner you'll be in line for the "pay-off." Why not do it TODAY?

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ACCURATE SPRING MFG. CO.
3819 W. Lake St. • Chicago 24, Ill.

Springs, Wire Forms, Stampings

Weir Calls Plant City Symbol of Opportunity; Hits Federal Meddling

Weirton, W. Va.

• • • **Ernest T. Weir,** in a recent talk here, called Weirton a symbol of American opportunity. He should know. Just 40 years ago he walked over the vacant land below what is now the golf club where he spoke to the Chamber of Commerce. He and his brother David, John Williams and Ed Mudge were looking for a new plant site in 1909.

The bankrupt tin mill they had bought at Clarksburg in 1905 was growing fast but it wasn't in the right spot for expansion. They wanted an integrated mill because E. T. Weir didn't like the idea of buying his sheet bars from competing tinplate producers.

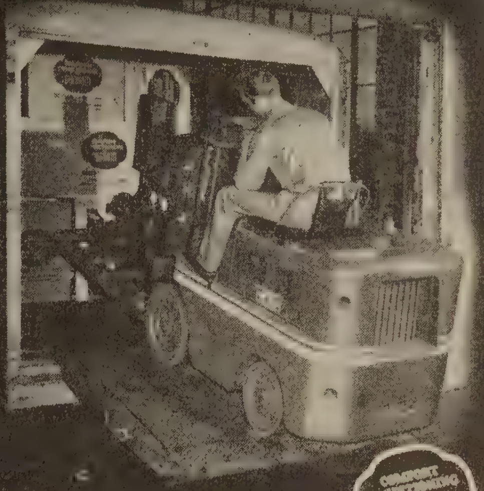
E. T. himself had started as an office boy for the old Braddock Wire Co., finally worked up to plant manager for American Sheet & Tinplate Co. When U. S. Steel was put together Weir took himself to Clarksburg where he and his immediate associates and 10 other men raised $250,000 to buy a relatively new but decrepit and bankrupt tinmill. They made a packet of money, and though not yet wealthy, were long on ambition. Four years later they raised another $300,000 to found the Weirton Steel Co.

Weirton had the location and the water they needed for an integrated mill. The original tract contained 105 acres; has since been expanded to 1200. As soon as they got 10 mills running they started adding 10 more. Within a year the Weirton operation was more than half again as big as the Clarksburg mill. In 1912 the Steubenville plant was purchased and 6 more mills were added at Weirton. Diversification of product began as well as acquisition of coal and ore properties.

"It is obvious," said Mr. Weir in his recent talk at Weirton, "that all of this could not have been done by just a few men alone. It has been a great cooperative enterprise requiring the thought and efforts of first hundreds, then thousands of people working together in a spirit of harmony."

"If anyone wants to know where

CLARK



"We 'comfort conditioned' our profits by using CLARK fork trucks"

Nothing is more conducive to managerial contentment and executive peace of mind than adding up the substantial savings effected by Clark Materials Handling Machines.

For example:

"Our Clark fork trucks cured several Materials Handling headaches, and stepped up productive capacity by speeding the flow of materials. Handling costs dropped more than 30 percent—substantial savings which, to use our own slogan, 'comfort conditioned' our profits. We find jobs for these machines—don't know how we ever got along without them."

F. E. Schmidt, Vice President
C. A. Dunham Company
Chicago, Illinois

There's strong likelihood that uncompromising examination of the average materials handling operation will disclose opportunities to make sizable cuts in costs, and rich promises that can be fulfilled quickly and most economically by a planned application of Clark's Modern Methods. And remember this: Clark builds *both* gas and electric battery-powered machines. You're sure of an unbiased recommendation when you CONSULT CLARK.

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REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD
AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

Enthusiastic Customers
do our BEST advertising

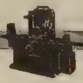
In one of the world's largest electrical equipment plants, three of a battery of eight Grand Rapids No. 25 Hydraulic Feed Surface Grinders precision grinding lamination dies for motor stators.

You will appreciate the micro-inch finish produced at production speeds on Grand Rapids Grinders. All Grand Rapids Hydraulic Feed Surface Grinders have these outstanding features:

1. One-piece column and base casting for vibrationless rigidity
2. Precision ball-bearing spindle which is greased for life
3. Bijur one-shot lubrication system eliminating hand oiling
4. Patented vertical movement of wheel head for quick, accurate adjustments
5. Portable coolant tank for ease of coolant replacement
6. Vane type hydraulic pump for fast longitudinal table travel

to serve you—

Your inquiry concerning your specific grinding needs will receive prompt attention. Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter and Tool Grinders, Hand Feed Surface Grinders, Drill Grinders, Tap Grinders, and Combination Tap and Drill Grinders.



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The fast tractor-footed load hustlers

● Wide open yard spaces that eat up profits start paying off with Roustabout Cranes on the job, loading, unloading, moving, shifting, stacking. Grab-bucket, hook or magnet, *where* you want them, *when* you want them. Engineered for years of overwork—mounted on wheel or crawler tractors. Loads to 7½ tons. Roustabout saves costly delays and manpower . . . pays for itself fast. Write for the money-saving facts today—to
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Photo courtesy of
Grinnell Corporation,
Warren, Ohio

ROUSTABOUT CRANE

HUGHES-KEENAN CORPORATION
DELAWARE, OHIO, U. S. A.
Load-Handling Specialists since 1904

Weirton Steel's profits have gone, he can see most of them right before his eyes when he looks at the Weirton plants. There they are in the buildings, the furnaces, and the machinery. You and [Weirton president] Tom Millsop and I will pass along some day, but those mills will stay here. They represent the profits of Weirton coming home to Weirton to provide economic lifeblood which supports the homes, the churches, the schools—the life of this community. Each time that profits have been plowed back into the Weirton Steel Co., the result has been a greater number of job opportunities, increased efficiency, and higher productivity which is the only thing that makes possible the combination of higher real earnings, shorter hours, and better working conditions."

Reverting to a favorite theme, the steelmaker blasted the type of thinking that is expanding government control. In our whole career we had no government aid, he declared, nor did we expect it. We were on our own. We did not have to consider many restrictive factors that are present today.

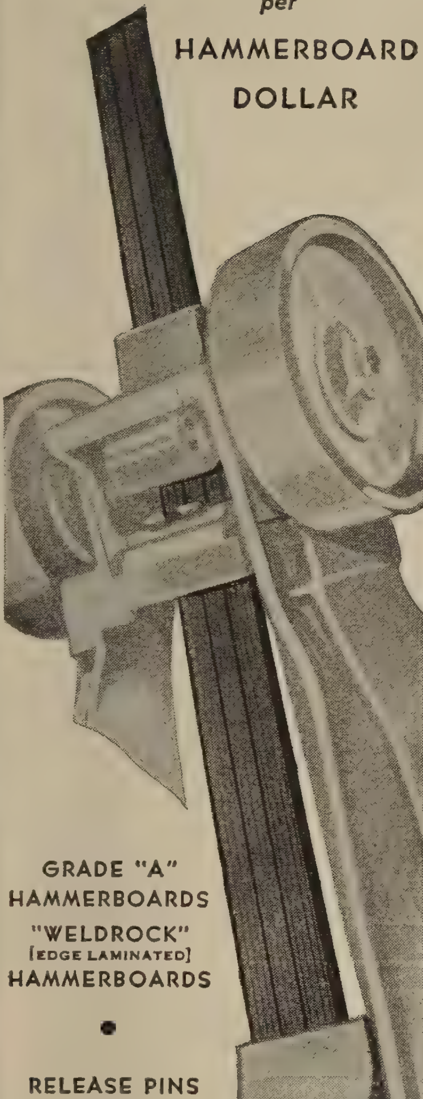
Mr. Weir asserted that "For years government has been nicking away at individual freedom and individual incentive. Now in complete frustration it proposes to take away all freedom and incentive, and concentrate complete control of the economy in the hands of government."

Small Change in Net Income

Chicago

• • • Sales in the first quarter of this year for Borg-Warner Corp. totalled $78,766,039, C. S. Davis, president of the company, told stockholders at their annual meeting. The corresponding quarter of last year showed a total sales of $77,100,076. Net income for the first three months of 1949 was $6,692,393. These earnings are equal to $2.79 per share and first quarter earnings last year were equal to $2.82 per share.

Mr. Davis announced that Borg-Warner plans to be in production on one or perhaps two types of fully automatic transmissions for automobiles before the end of the year. These transmissions are described as having certain performance characteristics not previously afforded the car owner.



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Increases Output Of Long Terne Sheets For Industrial Use

Niles, Ohio

• • • **Niles Rolling Mill** Co.'s new $100,000 plant addition, constructed for manufacture of long terne coated steel sheets, will begin operation about May 15, according to president James A. Roemer.

The addition will increase floor space of the galvanizing department by 4000 sq ft and of the warehouse by 7500 sq ft. It will house the long unit used to coat steel sheets with a mixture of lead and tin. From this process sheets ride on conveyers into the adjacent warehouse.

Long terne sheets are used principally in the manufacture of gasoline tanks for automobiles, trucks, buses, and tractors and have many other uses, Mr. Roemer explained, adding that "they can be used for almost any product on which a solderable coating is required."

The plant, operating at capacity, set a record in March with production amounting to 12,850 tons and shipments of 14,100 tons. The new product will help to diversify the company's products, according to Mr. Roemer.

To Talk on Design

Washington

• • • "Designing for Sales in 1949" will be discussed by William J. Russell, vice-president, Landers, Frary & Clark, at the third sales management conference of the Porcelain Enamel Institute, to be held June 24 in Hotel Carter, Cleveland.

The quickly-changing problems in merchandising domestic appliances in 1949 will be reviewed by Mr. Russell and he will discuss in particular the engineering approach to the solution of customer appeal in lower cost appliances, the importance of proper appliance finishes, and trends in consumer acceptability of various types of materials and finishes.

Mr. Russell was elected vice-president of Landers, Frary & Clark in 1943, and is in charge of all the company's research and engineering development. He is author of numerous articles on electrical appliance developments.

SMALL
STAMPINGS

Any Metal
Any Quantity
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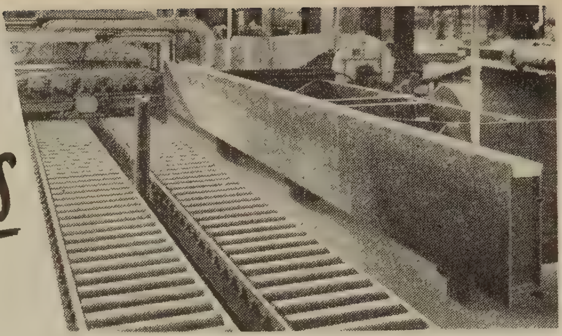
30 years' experience
gives us the
"know how"

Hundreds of satisfied
customers are evidence
of our high quality

THE
MASTER PRODUCTS
COMPANY
6400 PARK AVE. • CLEVELAND 3, OHIO

THIS TABLE'S SET FOR ⇨ HEAVY GUESTS ⇩



BUT IT'S A-F *Engineered* TO TAKE IT!

STEEL SHEETS are discharged onto this A-F *Engineered* piler table at a fast clip. Each sheet strikes the end stop and the back-up bar and then drops onto the sturdy rolls of the A-F Roller Conveyor. The sheets accumulate into a well aligned stack, which frequently weighs 50 tons—a real test for any conveying equipment. This is just one section of the A-F *Engineered* Completely Co-ordinated Conveying System that has increased efficiency and lowered handling costs.

Since 1901, Alvey-Ferguson Engineers have helped thousands of plants to make worth-while economies in handling materials and products. These 48 years of know-how are available to your plant, too. Why be satisfied with less? May we discuss *modern* conveyorized methods with you? Write, without obligation—today.

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558 Disney Street Cincinnati 9, Ohio
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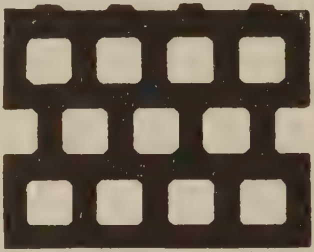
CONVEYING EQUIPMENT
Alvey-Ferguson
WASHING MACHINES FOR INDUSTRY

Perforated metal screens

for any requirement



WITH facilities for producing any shape and size of perforations in any commercially rolled metal, of whatever gauge desired, Hendrick can furnish the most suitable form for a specific screening application.

To best meet certain requirements, Hendrick developed the "squaround" perforation illustrated. Other standard forms include round, square, hexagonal, diamond and slot perforations in hundreds of sizes of openings. Write for full information.

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Armorgrids

HENDRICK
Manufacturing Company
37 DUNDAFF STREET, CARBONDALE, PENNA.
Sales Offices In Principal Cities

Stresses Importance Of Motor Freight Haulage

Chicago

• • • **Les Allman,** vice-president, Fruehauf Trailer Co., told more than 400 motor carrier executives, "It is high time that we approached highway problems from an engineering rather than a political angle," at a section meeting of the Central Motor Freight Assn. recently held at the Hotel Sherman. The speaker declared that highway hauling is still in its infancy despite the tremendous strides made in the last few years. He refuted charges that trucks break up the highways and declared that no studies have been made to determine the maximum gross loads for a single axle which will actually damage paving surfaces. Such charges, Mr. Allman declared, have no foundation in fact.

Mr. Allman commented on the need for better selling by the motor lines in order to develop business. He said that investigation has revealed that motor carriers generally are short in trained sales personnel. He stressed the importance of adequate training programs if the truck lines are to effectively satisfy shipments. Mr. Allman declared too many salesmen are overlooking the advantages of motor service through which consumers can reduce inventories by using the rapid truck delivery.

Sets New Safety Record

Pittsburgh

• • • **Westinghouse** Electric Corp. completed its "safest year" in 1948. T. O. Armstrong, director of the company's plant labor relations service, has reported that each of nine major Westinghouse plants and one division of the big East Pittsburgh plant compiled during 1948 a record of a million or more man-hours worked without a lost-time accident to any employe.

In an annual safety report, Mr. Armstrong disclosed that all the firm's manufacturing plants had a combined record of 172,534,170 man-hr worked with only 619 lost-time accidents—a safety record 40 pct better than the average of all electrical equipment manufacturers and 73 pct better than the average of all U. S. industries.

Construction Steel . . .

• • • **Fabricated steel awards** this week included the following:

600 Tons, Phoenixville, Pa., building for Charles Lachman, textiles, Phoenix Iron Co., Phoenixville, Pa.

250 Tons, Mercersburg, Pa., Mercersburg Academy, to Bethlehem Steel Co., Inc., Bethlehem.

130 Tons, Greensboro, Md., bridge Md. State Highway Dept., through George & Lynch, Wilmington, Del., to Bethlehem Steel Co., Inc., Bethlehem.

100 Tons, Wantagh, N. Y. Union Free School, District 23, to Grand Iron Works, Inc., New York.

4200 Tons, Elizabeth, Pa. Bridge superstructure on Rt. 51 for State Highway Dept., Fort Pitt Bridge Co., Pittsburgh, low bidder.

• • • **Fabricated steel inquiries** this week included the following:

4200 Tons, West Elizabeth, Pa., bridge, Pa. Dept. of Highways, Fort Pitt Bridge Co., Pittsburgh, low bidder.

4000 Tons, Milwaukee, manufacturing building for American Can Co.

2000 Tons, Philadelphia, two apartment buildings, Mayer Blum, through Turner Construction Co., Philadelphia, due May 17.

500 Tons, Trenton, N. J., building, N. J. Dept. of Highways, due May 24.

350 Tons, Philadelphia, St. Joseph's Hall at Fox Chase, due May 13.

320 Tons, Benson, Ariz., bridge on Benson-Steins Pass highway, State Highway Commission, Phoenix, bids to May 20.

• • • **Reinforcing bar awards** this week included the following:

1100 Tons, San Francisco, Youth Guidance Center, through Monson Bros. to Soule Steel Co., San Francisco.

450 Tons, Lebanon-Lancaster Counties, Pa., Pa. Turnpike Contract No. 210, to Harrison Construction Co., Pittsburgh.

445 Tons, Mankato, Minn., high school building, New Hagstrom Contracting Co., St. Paul, to Paper Calmenson Co., St. Paul.

395 Tons, Los Angeles, bridges over Santa Ana Pkwy at Los Angeles St., through J. E. Haddock, Ltd., to Blue Diamond Corp., Los Angeles.

350 Tons, Ames, Iowa, power plant for the City of Ames, to Laclede Steel Co., St. Louis.

325 Tons, Elmhurst, Ill., junior high school building through Patrick Warren Construction Co., Chicago, to J. T. Ryerson & Sons, Chicago.

215 Tons, Cleveland, Woolworth building to Builders Structural Co., Cleveland.

180 Tons, Philadelphia, recreation center at Wyoming and B Sts., to Cantley & Co., Philadelphia.

150 Tons, Middlesex Co., N. J., Route 4 Parkway, Section 2B and 2C, N. J. Dept. of Highways, to J. E. Chapman & Sons, Inc., Hillside, N. J.

145 Tons, La Grange, Ill., Nazareth Academy to George Sollitt Co., Chicago.

100 Tons, Springfield, Ill., Capital airport building through John Flemley Co., Bloomington, Ill., to Bethlehem Steel Co., Inc.

• • • **Reinforcing bar inquiries** this week included the following:

1200 Tons, Philadelphia, Penrose Ave. bridge, Bethlehem Steel Co., Inc., Bethlehem, low bidder.

1000 Tons, Madison, Wis., Veterans hospital; bids have been postponed to May 26.

500 Tons, Niles, Ill., Home of the Aged for St. Andrew Bobola. Bids due May 16.

135 Tons, Chicago, Roscoe St. sewer for the City of Chicago.

Profits Show Increase

Youngstown

• • • **Industrial Silica Corp.** reported 1948 net income of $267,389 compared with $165,645 net for 1947. The income statement showed gross profit on sales before depreciation and depletion was $680,959 compared with $482,886 the previous year.

Koppers Buys Freyn Co.

Pittsburgh

• • • **Koppers Co., Inc.,** is purchasing Freyn Engineering Co., Chicago, and Freyn's subsidiary Open Hearth Combustion Co. The purchase will be made by a transfer of stock. Freyn will continue under its present name, and for the time being will be operated as a wholly-owned subsidiary of Koppers. There will be no changes in policies or personnel.

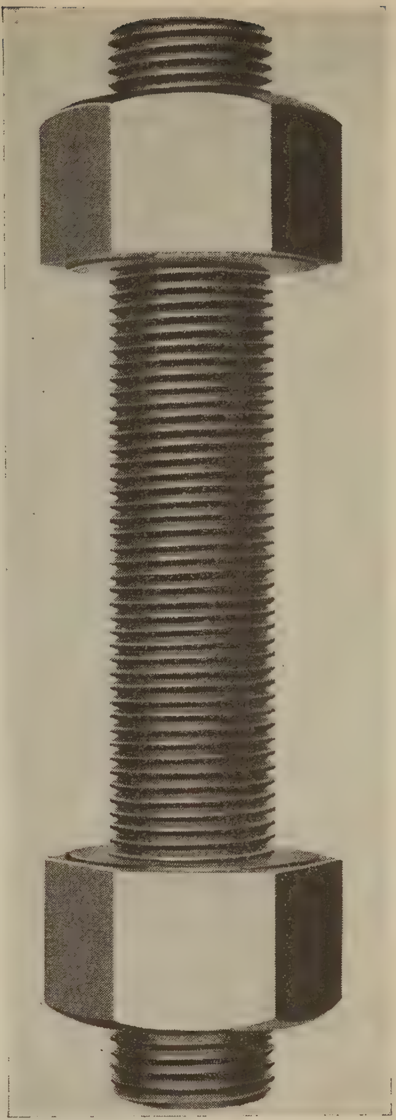
Freyn Engineering specializes in design and construction of blast furnaces and openhearths, and in the engineering of mills, power stations, and other steel mill facilities. The purchase was designed to round out the Koppers organization, whose engineering and construction division designs and builds byproduct coke ovens, auxiliaries and chemical plants.

Reelects Old Directors

Youngstown

• • • **Bessemer Limestone & Cement Co.** at its annual shareholders' meeting last week reelected all directors of the company. They are: A. E. Adams, Jr., L. E. Beeghly, W. E. Bliss, S. Livingston Mather, R. E. Roscoe, Charles F. Smith, R. C. Steese, Ernest E. Swartswelter, Fred Tod Jr., F. B. Warren and George G. Treat.

Mr. Treat, president of the company, told shareholders there is a big demand in sight for cement in 1949, at near the 1948 record shipments and he also foresees a big demand for limestone for another year.



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36 YEARS... in

PRECISION

HIGH QUALITY

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REPRESENTATION IN PRINCIPAL CITIES

Midwest Machine Tool Sales Up With Most Deliveries in 30 Days

No Important Price Changes In Last Month With Production Costs Still Unchanged

• • • Sales of machine tools in the midwest area for April were surprisingly good, builders and sellers reported to THE IRON AGE. The big corporations are going ahead with programs, none of which are extensive, but all of which are of enough size to be important to the industry.

Steel companies, foundries and some railroad shops continue to buy in fair volume, but the automotive industry business in the Chicago area is very poor.

Delivery can be had on practically any machine, including some specials, within 30 days. It appears that the competitive situation has moved some of the makers of special machinery to speed up their production and delivery dates.

No important price changes have taken place in the last month, although some downward adjustments have been made. Builders report that despite the fact that the price on some castings has been dropped, their production or operating rate in the building shops have gone down so far that they can't take full advantage of cheaper material and therefore offer the machines at lower prices. The overall burden of costs is still high.

The trend long talked about in the machine tool field of cleaning up machine tool design to eliminate costly features not absolutely necessary for the operation of the machine under most conditions is finally materializing. Most shops buying such machinery do not use all of the features built into the machine, all of which make the cost of the machine higher than if it were a standard tool.

A case in point is radial drills, many of which have 36-spindle speeds. Sellers of such tools report that most shops they do business with only utilize six or ten of these speeds and are, therefore, being penalized by paying a high price for a machine having features they never use.

The lathe field is in a somewhat similar position. Manufacturers of lathes now quoting on government business are starting to dig up the designs of some of the old models they used to build which are much cheaper to sell. They have found that such machines are suitable for the majority of applications and that the lower price at which they can quote such old models often lands business they otherwise would not get.

The machine tool industry in Chicago reports that standard tools as such are not finding their way into the ECA program. Most foreign countries have a basic machine tool industry producing plain utility type tools. Therefore, foreign companies wanting standard tools are told to order them from their home industry. This buy-at-home policy does not affect most specials and special machinery is about the only type moving at the moment into the ECA program.

In Philadelphia the trade estimates that about half the tooling for the Kansas City Navy gas turbine plant for which business is still being placed here will come out of JANMAT. There are only two plants in the Philadelphia area with authority to place orders for tools on government contracts without reference to JANMAT. One is Heintz Mfg. Co., and the other is I.T.E. Circuit Breaker Co. Net result is that the emergency tool reserve is being gradually whittled away with scant prospect of replacement. Business is very competitive here, but dealers are optimistic over the volume of inquiries on hand.

Trade observers point out that this is no longer a market where machine tool builders who are not in a position to adapt their equipment to requirements of buyers can compete successfully. A key to sales in this, and any other market for that matter, is the length of time in which a machine tool can be shown to pay for itself. Two to 3-year periods are common, but in some cases the tool must pay for itself within a year.

In Cincinnati, the Cincinnati Milling Machine Co. reported the work week has climbed to "over 45 hr." Many other plants operating an average of 32 hr have said they are "considering" a 40-hr week.

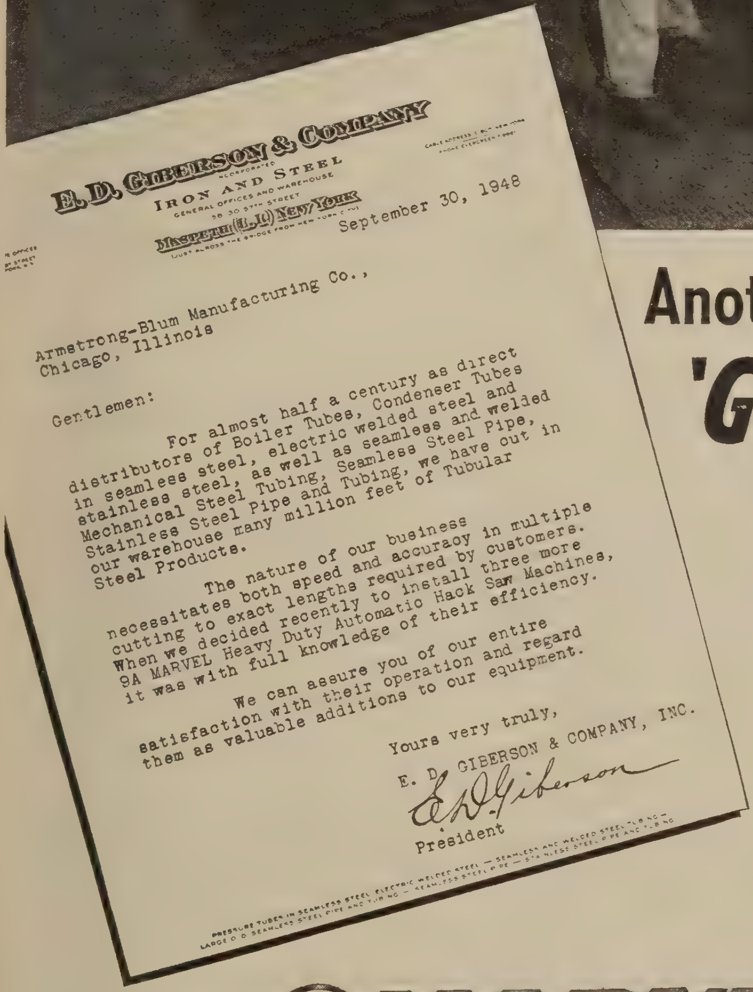
First quarter earnings of Cincinnati Milling Machine Co. were $577,921 compared to $467,915 for first quarter 1948. A 35¢ dividend was declared on common stock and all officers were relected.

The trend in the industry in Cincinnati stands almost alone among reports of a continuing mild decline throughout general business. Part of the explanation, leaders say, lies in the receipt of foreign orders, particularly from ECA. But the majority of the orders come from widely scattered sources.

In Cleveland, officials of Warner & Swasey Co. and international officers of the two unions, the Indedependent International Assn. of Machinists, District 54, and the Patternmakers Union (AFL) were scheduled to meet in New York last week in an effort to arrange settlement of a strike begun Dec. 27 by 1800 company employees.

The dispute was referred to international officers of the unions for settlement after negotiations failed and became deadlocked Apr. 7 on the unions' demands for a 10¢ hourly wage increase, reduced from 19¢ and six paid holidays.

In Detroit, builders and suppliers of machine tools have their eyes fastened on the Ford strike, trying to anticipate the possible effects on machine tool activity here. While Ford buying has recently been in low volume, there are a number of Ford proposals in the quotation state, it is reported. It has not yet been determined whether or not these proposed programs will be allowed to go forward during the strike.



E. D. GIBERSON & COMPANY
INCORPORATED
IRON AND STEEL
GENERAL OFFICES AND WAREHOUSE
58 30 57TH STREET
MASPETH (L.I.) NEW YORK
(JUST ACROSS THE BRIDGE FROM NEW YORK CITY)

September 30, 1948

Armstrong-Blum Manufacturing Co.,
Chicago, Illinois

Gentlemen:

For almost half a century as direct distributors of Boiler Tubes, Condenser Tubes in seamless steel, electric welded steel and stainless steel, as well as seamless and welded Mechanical Steel Tubing, Seamless Steel Pipe, Stainless Steel Pipe and Tubing, we have out in our warehouse many million feet of Tubular Steel Products.

The nature of our business necessitates both speed and accuracy in multiple cutting to exact lengths required by customers. When we decided recently to install three more 9A MARVEL Heavy Duty Automatic Hack Saw Machines, it was with full knowledge of their efficiency.

We can assure you of our entire satisfaction with their operation and regard them as valuable additions to our equipment.

Yours very truly,

E. D. GIBERSON & COMPANY, INC.

E D Giberson

President

PRESSURE TUBES IN SEAMLESS STEEL ELECTRIC WELDED STEEL — SEAMLESS AND WELDED STEEL TUBING —
LARGE O D SEAMLESS STEEL PIPE AND TUBING — SEAMLESS STEEL PIPE — STAINLESS STEEL PIPE AND TUBING

Another Tubing Warehouse "Goes MARVEL"

Warehouses that are not equipped with proper sawing machines find that the cutting of steel tubing (especially the stainless types) is a difficult and costly job. But E. D. Giberson & Company, New York, have cut off millions of feet of all types and sizes of steel tubing to accurate lengths, economically and without difficulty, due to the fact that they have long been properly equipped with MARVEL SAWS. And because they have found MARVEL SAWS so trouble-free, so reliable, so economical to operate and so universally suited to all their cutting-off jobs, they have recently added this row of three new MARVEL No. 9A Automatic Hack Saws. With this additional equipment, they have expanded their facilities and can more promptly serve their fast-growing list of satisfied customers with steel tubing of all types and sizes, "cut to customer's specified lengths".

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NONFERROUS METALS

. . . *News and Market Activities*

Metals Prices Edging Lower As Probing Action Continues

New York

• • • **Price reductions** were made last week in copper and lead, and on May 9 there were additional reductions in copper and zinc. Aluminum ingot prices were down another ½¢ per lb; 1¢ per lb on deoxidizing grades. All brass mills are now on the 18.50¢ copper basis.

Aside from the price developments, the big news of the week was the rejection by Kennecott Copper Corp. of the recommendation of the fact finding committee that the Brotherhood of Locomotive Firemen and Enginemen be granted a wage increase of $2.71 per 8-hr day. The recommendation was for a retroactive wage increase of 96¢ a day between July 1, 1948 and Feb. 4, 1949, after which the increase would include $1.75 additional. On May 6, the company rejected the committee recommendation, reverting again to its original offer of 96¢ a day increase.

This was the amount which had been offered to 13 unions involved in its Utah operations. The offer was accepted by 12 unions, but the Brotherhood representing only 320 enginemen and firemen refused to settle on this basis and tied up the entire Utah Mine operations for 3½ months. There was an estimated loss of 80,000 tons of copper production which caused a severe dislocation of the supply and demand relationship.

Kennecott Copper Objects To Recommendations of Fact Finding Committee

° ° °

The reaction of the company to the proposal of the committee could almost have been predicted at the time of its announcement, for it was for the same amount demanded by the union in advance of the costly strike at a time when copper was badly needed by domestic industry. Now there is a complete change in the copper market and Kennecott announced a price reduction of 5¢ per lb on May 6 to meet competitive conditions. It is clear that the resistance to any increase above the 96¢ figure would be much firmer now. In the the negotiations preceding the strike an offer to submit the dispute to arbitration was made by the company but it was rejected by the union.

The first reduction in the price of copper by a mine producer was made by Phelps Dodge on May 4 when its price was reduced to 20¢, 1½¢ above the prevailing custom smelter price. On May 9 a leading custom smelter reduced its price by another ½¢, bringing down the price to 18¢. The lowest since Nov. 19, 1946. As of Monday, no mine producer had reduced its price to the 18¢ level. Phelps Dodge was still at the 20¢ level, and the Anaconda price was unchanged.

The price of lead was reduced by 1¢ to 14¢ at New York by a custom smelter on May 6, following the news of an offering of nearly 8000 tons of German lead to the Army for shipment to Japan by Continental Ore Co., New York, at a price equivalent to $13.50, New York. On Monday, St. Joseph Lead Co. indicated that it did not expect to follow the reduction at this time. The current lead price is lower than any since Mar. 3, 1947.

The price of zinc was reduced another ½¢ per lb on May 9 by a custom smelter, bringing down the price of Prime Western to 12¢ East St. Louis.

Prices of scrap metals have been reduced correspondingly. In addition, dealers are reducing their buying prices somewhat more to build up their margin in view of the possibility of further price reductions. Dealers report that margins had been averaging $20 to $25 a ton, in comparison to the normal margin of $30 to $35 a ton.

Price reductions in metals have not been effective in improving demand so far. In the present state of the markets, whenever a price is lowered by any factor in the market, that producer is sure to take the available business. Brass mill demand has been inactive for some time, including tubing which held up well for a while after the decline in flat-rolled demand. Now even the buying of wire and cable is reported to have fallen off.

Canada's Prices Down

Toronto

• • • **Reductions in** copper and zinc prices were announced last week by leading Canadian producers. Copper fell 1½¢ to 20¢ per lb., Toronto and Montreal, and zinc was cut ½¢ with Prime Western selling at 12¼¢, Grade A 13¢ and Special High Grade 13¼¢ per lb., Toronto and Montreal. No change was reported in lead which is holding at 14¾¢ per lb.

Price reductions were announced simultaneously by Consolidated Mining & Smelting Co. of Canada, Noranda Mines Ltd., and Hudson Bay Mining & Smelting Co. Ltd.

Nonferrous Metals Prices

	May 4	May 5	May 6	May 7	May 9	May 10
Copper, electro, Conn.	18.50–23.50	18.50–23.50	18.50–20.00	18.50–20.00	18.00–20.00	18.00–20.00
Copper, Lake, Conn.	23.625	23.625	23.625	23.625	18.625	18.625
Tin, Straits, New York	$1.03	$1.03	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	12.50	12.50	12.50	12.50	12.00	12.00
Lead, St. Louis	14.80	14.80	13.85–14.80	13.85–14.80	13.85–14.80	13.85–14.80

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Bismuth, ton lots	$2.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	18.00 to 20.00
Copper, lake, Conn. Valley	18.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $110
Lead, St. Louis	13.85 to 14.80
Lead, New York	14.00 to 15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$82 to $84
Nickel, electro, f.o.b. New York	42.93
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$72 to $75
Silver, New York, cents per oz.	71.50
Tin, Grade A, New York	$1.03
Zinc, East St. Louis	12.00
Zinc, New York	12.70
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot		
No. 115	15.25*	17.00
No. 120	14.75*	16.50
No. 123	14.25*	16.00
80-10-10 ingot		
No. 305	....	21.75
No. 315	....	18.75
88-10-2 ingot		
No. 210	....	28.50
No. 215	....	25.50
No. 245	18.00*	20.25
Yellow ingot		
No. 405	13.00*	14.50
Manganese bronze		
No. 421	....	19.50

* F.o.b. Philadelphia.

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.50-21.00
0.60 copper, max.	20.00-20.50
Piston alloys (No. 122 type)	17.50-18.00
No. 12 alum. (No. 2 grade)	16.50-17.00
108 alloy	16.75-17.25
195 alloy	18.00-18.50
13 alloy	20.00-20.50
AXS-679	17.50-18.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95 pct-95½ pct	17.25-17.50
Grade 2—92 pct-95 pct	16.25-16.50
Grade 3—90 pct-92 pct	15.25-15.50
Grade 4—85 pct-90 pct	14.50-15.00

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	38⅛
Electrodeposited	32⅝
Rolled, oval, straight, delivered	32.34
Ball anodes	36⅝
Brass, 80-20	
Cast, oval, 15 in. or longer	33⅞
Zinc, oval, 99.886, f.o.b. Detroit	22½
Ball anodes	20½
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	48.00
Copper sulfate, 99.5 crystals, bbls.	9.10
Nickel salts, single or double, 4-100 lb bags, frt. allowed	18.00
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz. lots, per oz.	59
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc sulfate, crystals, 22.5 pct, bags	6.75
Zinc sulfate, 25 pct, flakes, bbls.	7.75

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 35.1¢ to 66¢; 11 to 13, 36.1¢ to 78¢; 23 to 25, 38.2¢ to $1.07; 35 to 37, 45.7¢ to $1.65; 47 to 49, 67.5¢ to $2.41.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅜ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2⅛ to 3⅜ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢; 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	..	40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Sheets	Rods	Extruded Shapes
Copper	32.18	....	31.78
Copper, hot-rolled	....	28.03	....
Copper, drawn	....	29.28	....
Low brass	30.67	30.36	33.58*
Yellow brass	29.60	29.29	32.61*
Red brass	31.01	30.70	33.92*
Naval brass	34.65	28.71	29.96
Leaded brass	....	24.21	29.45
Commercial bronze	31.88	31.57	34.54*
Manganese bronze	38.15	32.05	33.55
Phosphor bronze, 5 pct	51.30	51.55	....
Muntz metal	32.68	28.24	29.49
Everdur, Herculoy, Olympic, etc.	37.03	35.95	..
Nickel silver, 10 pct	40.28	42.69	42.83
Architectural bronze	....	....	28.40

*Seamless tubing

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	16⅛	15⅝
Yellow brass	13⅞	13⅛
Red brass	15	14¼
Commercial bronze	15⅛	14⅜
Manganese bronze	13¾	12⅞
Leaded brass rod ends	13⅝	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper, wire	12.50
No. 2 copper, wire	11.50
Light copper	10.50
Refinery brass	10.00*
Radiators	6.72

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	12.50
No. 2 copper, wire	11.50
Light copper	10.50
No. 1 composition	10.00
No. 1 comp. turnings	9.50
Rolled brass	8.75
Brass pipe	9.00
Radiators	8.00
Heavy yellow brass	7.50
Aluminum	
Mixed old cast	8.50
Mixed old clips	8.50
Mixed turnings, dry	7.00
Pots and pans	8.50
Low copper	12.00

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	11 —11¼
No. 2 heavy copper and wire	10 —10¼
Light copper	9 — 9¼
Auto radiators (unsweated)	6 — 6¼
No. 1 composition	8¼— 8½
No. 1 composition turnings	8 — 8¼
Clean red car boxes	7 — 7¼
Cocks and faucets	7 — 7¼
Mixed heavy yellow brass	6 — 6¼
Old rolled brass	6½— 7
Brass pipe	7¾— 8
New soft brass clippings	10½—11
Brass rod ends	7 — 7½
No. 1 brass rod turnings	6 — 6½

Aluminum

Alum. pistons and struts	4 — 4¼
Aluminum crankcases	6 — 6½
2S aluminum clippings	10 —10½
Old sheet and utensils	6 — 6½
Borings and turnings	3 — 3½
Misc. cast aluminum	6 — 6½
Dural Clips (24S)	6 — 6½

Zinc

New zinc clippings	6 — 6½
Old zinc	4½— 5
Zinc routings	3½— 3¾
Old die cast scrap	— 3

Nickel and Monel

Pure nickel clippings	17 —18
Clean nickel turnings	15 —16
Nickel anodes	17 —18
Nickel rod ends	17 —18
New Monel clippings	13½—14½
Clean Monel turnings	8 — 9
Old sheet Monel	10 —11
Old Monel castings	8 — 9
Inconel clippings	11 —12
Nickel silver clippings, mixed	6½— 7½
Nickel silver turnings, mixed	6 — 6½

Lead

Soft scrap lead	8 — 8½
Battery plates (dry)	4 — 4½

Magnesium Alloys

Segregated solids	8 — 9
Castings	4½— 5⅛

Miscellaneous

Block tin	70 —72
No. 1 pewter	47 —49
No. 1 auto babbitt	40 —42
Mixed common babbitt	9½—10
Solder joints	14 —15
Siphon tops	45 —47
Small foundry type	11½—12
Monotype	10½—11
Lino. and stereotype	10 —10½
Electrotype	7½— 8
New type shell cuttings	9¼— 9½
Hand picked type shells	4½— 5
Lino. and stereo. dross	6½— 7
Electro. dross	4 — 4½

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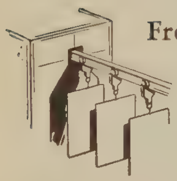

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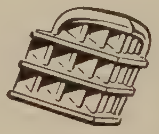

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SCRAP

. . . News and Market Activities

Uncertainty Again Prevails in Market

New York

• • • **The market** which had shown signs of leveling off in some of the areas, shows new uncertainty this week. There are no large orders and consumers still are not interested in this low priced material. There has been some buying, on a limited scale. Some scrap grades were sold above market quotations.

THE IRON AGE scrap composite price dropped 33¢ per gross ton to $22.75 per gross ton, or the same low for this year which was made on Apr. 19. Prices for No. 1 heavy melting steel this week are: Pittsburgh, $22.50 to $23.00; Chicago, $23 to $24; and Philadelphia, $21.50 to $22.50.

Brokers have been looking for orders, but consumers are not interested because of high priced inventories, lack of new orders, and a small order backlog. Some mills are doing a little buying, but not enough to cause stiffening prices. Other sources indicate that they will not buy during May or June.

Interest appears in some items for a week or two and then demand slackens. This may be a probing of the market to see if a definite price trend has been established. Some dealers have lost interest because of the low prices and consequently curtailed their operations. Both dealers and brokers do not wish to commit themselves as to when the market will again show some signs of activity.

Concern has been shown over the reported end of the scrap shortage. Brokers as well as dealers are hesitant in making future market commitments. Some wish the future would never come for fear of what it may bring.

•

PITTSBURGH—A number of brokers have taken orders for No. 1 steel to deliver here at $23 a ton. The individual orders were small, 300 to 500 tons, but the total purchase is a representative tonnage in today's thin market. Broker buying of No. 2 steel—what little there is—sets this price at $20.50 to $21.00 delivered. Both these are drops of $1.00 from last week's quotation. Material bought at these low prices must be local and the quantity must be small but until larger buying shows up to push prices up, these prices represent a considered appraisal of the market under current conditions. Some local railroad No. 1 steel was sold out of the district at prices from 50¢ to $1.00 above the quotations appearing here but the local material is reported to be covering on old orders. Local railroad No. 1 steel prices will be more definitely established later this week. Meanwhile railroad specialties are off $3.00 for the week.

•

CHICAGO—The market remained stable last week. Although considerable tonnages were being talked about and otherwise considered little materialized as actual orders. Present prices are restricting the amounts of scrap that can be brought in. The old OPA shipping point price of $14 in surrounding states is no longer adequate as freight rates now preclude buying such tonnages against the present price. Thus today's prices are actually under OPA for much scrap located outside the Chicago area. Some interest is again being shown in bundled machine shop turnings. This item was removed from the Chicago list some weeks ago as it had ceased to exist as a regular grade. This item will be reinstated if and when sales are made.

•

PHILADELPHIA—The scrap market in this district was quiet last week, with brokers' shipments at an estimated 25 to 30 pct of normal. Business was being placed in major grades in very small volume. Previous prices are holding, except in machine shop turnings which is off $1. Cast grades are holding firm. There is no market at present for mixed turnings. Other prices are unchanged.

•

CLEVELAND—Bulk of the scrap tonnage moving here and in the Valley this week was production scrap in a market in which the principal sign of life was the release of shipments on a restricted basis by Republic Steel Corp., Monday. Little dealer tonnage is moving and demand for No. 2 steel and No. 2 bundles is at a low ebb. At the same time, the present low prices are reported drying up some sources of dealer scrap supply and it is doubtful if brokers could cover large tonnages at the present prices. Four railroad lists closed here last week and No. 1 brought from $25 to $26.50 and more. One broker reportedly got most of it. On the other hand, distressed tonnage can be bought at quoted prices. Latest product of the rumor factory here is that the government will make a move in the near future to discourage consumption of iron ore and encourage consumption of scrap both as a market program and an iron ore conservation measure.

•

CINCINNATI—Growing reluctance on the part of some dealers to handle some grades of scrap at present prices was reported here this week in an otherwise dull market. Brokers are looking for orders, but doubt if they could cover big tonnages at current quotations. On the other hand, one major consumer is holding up shipment and two others are out of the market on all grades except blast furnace and some customer tonnage. Foundries are taking little tonnage. As is the case with mills, foundries have plenty on the ground and brokers doubt that many would buy at any price at the present time.

•

DETROIT—Plant scrap is moving here but yard material, it is reported, continues to go begging. In the absence of mill buying of dealer scrap, Detroit scrap prices are drifting uncertainly but the present trend appears to be downward. A revision of the No. 2 heavy melting price has been made to bring this price into line with present conditions in other scrap centers. Meanwhile, the Ford strike is expected almost immediately to be reflected in sharply reduced plant scrap generation, both by some of the Ford units and Ford suppliers.

•

NEW YORK—Business in this area is practically at a standstill. There is no consumer buying, and what little there is sets the current quotations. There is no apparent trend in the prices and the list remains unchanged. However, there has been some mill buying of heavy breakable cast at $22.00 to $22.50, but not enough to warrant a price change. Some sources indicate that it may be fall before any large scale buying will again take place.

•

ST. LOUIS—The market for melting grades is unchanged, there being no further buying by the mills in the St. Louis industrial area. It is understood that one broker still has an unfilled order for No. 2 heavy melting at $22 and is paying above the market price to get the material. There has been a noticeable drop in offerings, except from the railroads since the sharp drop in prices. Small fill-in sales of foundry grades were made at lower prices.

•

BOSTON—An old order calling for No. 1 heavy melting steel delivery at $16 to $17, brokers price f.o.b. is apparently out of the way and the price has settled back to $14.50 to $15. Extreme dullness and little price change characterizes the market. There is no change in the cast situation. Brokers and dealers just guess at prices and do not want to talk about it.

•

BIRMINGHAM—The price undertone is weaker in this scrap market. No. 1 cupola cast is down $2 per ton. Buying is extremely light on all grades for another week. Very little material is being received at dealer's yards, and in the face of price uncertainty dealers are making no effort to increase inventories.

•

BUFFALO—Openhearth scrap dropped $1 to $1.50 a ton in the past week on sales estimated at 4000 tons to a leading consumer. No. 2 heavy melting brought $20 and No. 2 bundles $18. No. 1 steel, which has quieted to a whisper due to withdrawal of the chief user of that grade heretofore, slipped $1 in sympathy. The latter interest is reported limiting open market purchases to No. 2 steel and using railroad and home scrap to boost quality of charges. The rail specialties, low phos. plate also were off $1.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$22.50 to $23.00
R.R. hvy. melting	24.50 to 25.00
No. 2 hvy. melting	20.50 to 21.00
No. 2 bundles	18.50 to 19.00
RR. scrap rails	28.00 to 28.50
Rails 2 ft and under	33.50 to 34.00
No. 1 comp'd bundles	22.50 to 23.00
Hand bdld. new shts.	20.50 to 21.00
Hvy. steel forge turn	20.50 to 21.00
Mach. shop turn.	15.50 to 16.00
Shoveling turn.	18.00 to 18.50
Mixed bor. and ms. turn.	15.50 to 16.00
Cast iron borings	18.00 to 18.50
No. 1 mach. cast.	27.50 to 28.00
Mixed yard cast.	22.00 to 22.50
Hvy. breakable cast.	23.00 to 23.50
Malleable	30.50 to 31.00
RR. knuck. and coup.	27.50 to 28.00
RR. coil springs	27.50 to 28.00
RR. leaf springs	27.50 to 28.00
Rolled steel wheels	27.50 to 28.00
Low phos.	25.00 to 25.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	21.00 to 22.00
No. 1 bundles	23.00 to 24.00
No. 2 dealers' bundles	19.00 to 20.00
Mach. shop turn.	12.00 to 13.00
Short shov. turn.	15.00 to 16.00
Cast iron borings	14.00 to 15.00
Mix. borings and turn.	12.00 to 13.00
Low phos. hvy. forge	27.00 to 28.00
Low phos. Plates	24.00 to 26.50
No. 1 RR. hvy. melt	25.00 to 25.50
Rerolling rails	28.00 to 32.00
Miscellaneous rails	28.00 to 29.00
Angles & splice bars	29.00 to 30.00
Locomotive tires, cut	31.00 to 32.00
Cut bolster & side frames	31.00 to 32.00
Standard stl. car axles	30.00 to 32.50
No. 3 steel wheels	26.50 to 27.50
Couplers and knuckles	26.50 to 27.50
Rails, 2 ft and under	31.00 to 34.00
Malleable	24.00 to 26.00
No. 1 mach. cast	27.00 to 29.00
No. 1 agricul. cast.	25.00 to 26.00
Heavy breakable cast.	21.00 to 22.50
RR. grate bars	18.00 to 19.00
Cast iron brake shoes	19.00 to 20.00
Cast iron car wheels	29.00 to 30.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$20.00 to $21.00
No. 2 hvy. melting	19.00 to 20.00
No. 1 bundles	19.00 to 20.00
No. 2 bundles	17.00 to 18.00
Mach. shop turn.	9.00 to 10.00
Shoveling turn.	10.00 to 11.00
Cast iron borings	10.00 to 11.00
Mixed bor. & turn.	9.00 to 10.00
Low phos. 18 in. under	26.00 to 27.00
No. 1 cupola cast.	27.00 to 28.00
Hvy. breakable cast.	19.00 to 20.00
Rails 18 in. and under	32.50 to 33.50
Rails random length	22.00 to 23.00
Drop broken	30.00 to 31.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$14.50 to $15.00
No. 2 hvy. melting	12.50
No. 1 bundles	12.00 to 12.50
No. 2 bundles	10.50 to 11.50
Bushelings	12.50
Shoveling turn.	10.00 to 10.50
Machine shop turn.	5.50 to 6.00
Mixed bor. and turn.	5.50 to 6.00
Cl'n cast chem. bor.	11.00 to 13.00
No. 1 machinery cast.	25.00 to 28.00
No. 2 machinery cast.	24.00 to 26.00
Heavy breakable cast.	16.00 to 17.00
Stove plate	20.50 to 21.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	$16.50 to $17.00
No. 2 hvy. melting	14.50 to 15.00
No. 1 bundles	16.50 to 17.00
New busheling	16.50 to 17.00
Flashings	16.50 to 17.00
Mach. shop turn.	10.00 to 11.00
Shoveling turn.	11.00 to 12.00
Cast iron borings	11.00 to 12.00
Mixed bor. & turn.	10.00 to 11.00
Low phos. plate	16.50 to 17.00
Heavy breakable cast.	13.00 to 17.00
Stove plate	16.00 to 17.00
Automotive cast.	23.00 to 25.00
No. 1 cupola cast.	19.00 to 23.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$21.50 to $22.50
No. 2 hvy. melting	19.00 to 20.00
No. 1 bundles	21.50 to 22.50
No. 2 bundles	17.00 to 18.00
Mach. shop turn.	13.00 to 14.00
Shoveling turn.	16.00 to 17.00
Mixed bor. and turn.	12.00 to 13.00
Clean cast chemical bor.	21.00 to 22.00
No. 1 machinery cast.	27.00 to 29.00
No. 1 mixed yard cast.	25.00 to 27.00
Hvy. breakable cast.	27.00 to 28.00
Hvy. axle forge turn.	21.50 to 22.50
Low phos. acid openhearth	25.00 to 26.00
Low phos. electric furnace	27.00 to 28.00
Low phos. bundles	23.00 to 24.00
RR. steel wheels	29.00 to 30.00
RR. coil springs	29.00 to 30.00
RR. malleable	24.00 to 28.00
Cast iron carwheels	29.00 to 30.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$21.00 to $22.00
No. 2 hvy. melting	19.00 to 20.00
No. 2 bundled sheets	19.00 to 20.00
Mach. shop turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Locomotive tires, uncut	23.00 to 24.00
Mis. std. sec. rails	22.00 to 23.00
Steel angle bars	26.00 to 27.00
Rails 3 ft and under	29.00 to 30.00
RR. steel springs	24.00 to 25.00
Steel car axles	25.00 to 27.00
Brake shoes	21.00 to 22.00
Malleable	23.00 to 24.00
Cast iron car wheels	26.00 to 28.00
No. 1 machinery cast	29.00 to 30.00
Hvy. breakable cast.	19.00 to 20.00
Stove plate	22.00 to 23.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy melting	$20.00
No. 2 hvy. melting	20.00
No. 2 bundles	18.00
No. 1 busheling	20.00
Long turnings	14.00
Shoveling turnings	17.00
Cast iron borings	17.00
Bar crops and plate	$24.00 to 25.00
Structural and plate	24.00 to 25.00
No. 1 cupola cast.	27.00 to 28.00
Stove Plate	24.00 to 25.00
No. 1 RR. hvy. melt.	22.00 to 23.00
Steel axles	26.00 to 27.00
Scrap rails	23.00
Rerolling rails	27.00
Angles & splice bars	26.00 to 28.00
Rails 3 ft & under	25.00 to 26.00
Cast iron carwheels	29.00 to 30.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$23.50 to $24.00
No. 2 hvy. melting	20.50 to 21.00
No. 1 bundles	23.50 to 24.00
No. 2 bundles	19.00 to 19.50
Mach. shop turn.	13.50 to 14.00
Short shov. turn.	18.50 to 19.00
Cast iron borings	18.50 to 19.00
Low phos.	24.50 to 25.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$15.00 to $16.00
No. 2 hvy. melting	13.00 to 14.00
No. 2 bundles	12.00 to 13.00
Mach. shop turn	7.50 to 8.00
Mixed bor. turn.	7.50 to 8.00
Shoveling turnings	9.50 to 10.00
Machinery cast.	22.00 to 23.00
Mixed yard cast.	20.00 to 21.00
Heavy breakable cast.	20.00 to 21.00
Charging box cast	20.00 to 21.00
Unstrp. motor blks.	16.00 to 17.00
Cl'n cast chem. bor.	12.00 to 14.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$22.50 to $23.50
No. 2 hvy. melting	20.50 to 21.50
No. 1 bundles	19.50 to 20.00
No. 2 bundles	17.50 to 18.00
No. 1 busheling	19.50 to 20.00
Mach. shop turn.	12.00 to 13.00
Shoveling turn.	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Mixed bor. and turn.	16.00 to 17.00
Cupola cast.	29.00 to 30.00
Mixed yard cast.	27.00 to 28.00
Stove plate	27.00 to 28.00
Small indus. malleable	21.00 to 22.00
Low phos. plate	23.50 to 24.50
Scrap rails	27.00 to 28.00
Rails 3 ft & under	32.00 to 33.00
RR. steel wheels	28.00 to 29.00
RR. coil & leaf spgs.	28.00 to 29.00
RR. knuckles & coup.	28.00 to 29.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$22.50 to $23.00
No. 2 hvy. melting	18.00 to 18.50
No. 1 bundles	22.50 to 23.00
No. 2 bundles	16.00 to 16.50
No. 1 busheling	22.50 to 23.00
Drop forge flashings	22.50 to 23.00
Mach. shop turn.	12.50 to 13.00
Shoveling turn.	18.00 to 18.50
Steel axle turn.	19.50 to 20.00
Cast iron borings	18.00 to 18.50
Mixed bor. & turn.	18.00 to 18.50
Low phos. 2 ft and under	23.50 to 24.00
No. 1 mach. cast	28.00 to 29.00
Malleable	25.00 to 26.00
RR. cast.	28.00 to 29.00
Railroad grate bars	20.00 to 21.00
Stove plate	20.00 to 21.00
RR. hvy. melting	23.50 to 24.00
Rails 3 ft and under	32.00 to 33.00
Rails 18 in. and under	33.00 to 34.00

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bales	16.00
No. 2 bales	16.00
No. 3 bales	13.00
Mach. shop turn.	12.00
Elec. fur. 1 ft under	30.00
No. 1 cupola cast.	$30.00 to 35.00
RR. hvy. melting	20.00
Rails	23.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bales	16.00
No. 2 bales	16.00
No. 3 bales	13.00
Mach. shop turn.	12.00
Elec. fur. 1 ft under	30.00
No. 1 cupola cast.	$30.00 to 35.00
RR. hvy. melting	20.00

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy melt	$20.00
No. 1 & No. 2 bales	16.00
No. 3 bales	13.00
Elec. fur. 1 ft and under	30.00
No. 1 cupola cast.	$28.00 to 30.00
RR. hvy. melting	20.00

HAMILTON, ONT.

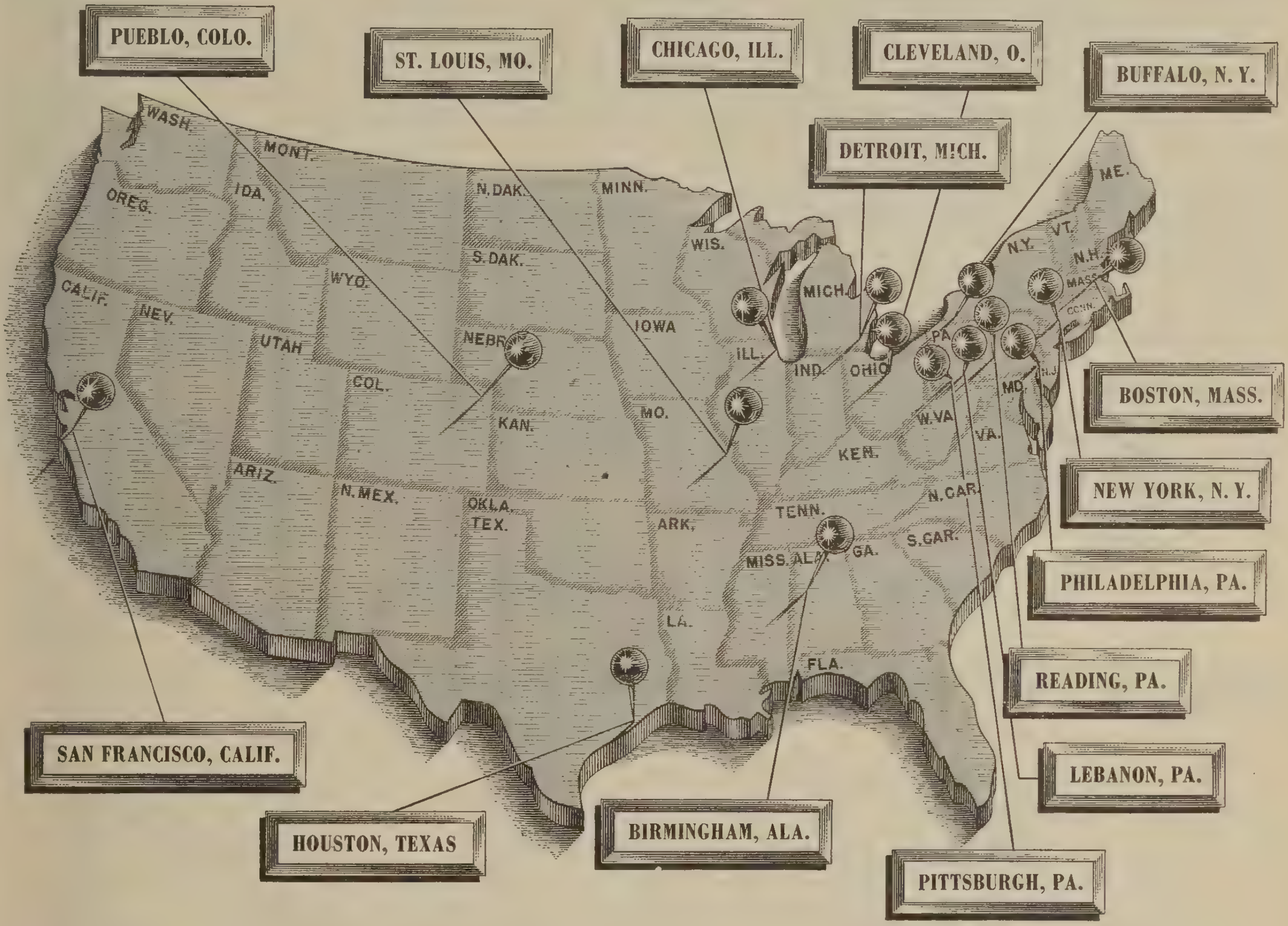
Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point:

Heavy melting	$23.00*
No. 1 bundles	23.00*
No. 2 bundles	22.50*
Mechnical bundles	21.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.50*
Bushelings, new fact, prop'd	21.00*
Bushelings, new fact, unprop'd	16.00*
Short steel turnings	17.00*
No. 1 cast.	$48.00 to 50.00
No. 2 cast.	44.00 to 45.00

*Ceiling Price.

For the Purchase or Sale of Iron and Steel Scrap . . .

CONSULT OUR NEAREST OFFICE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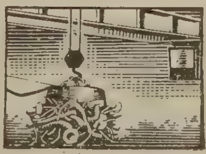

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	May 10, 1949	May 3, 1949	Apr. 12, 1949	May 11, 1948
Hot-rolled sheets	3.25	3.25	3.26	2.775
Cold-rolled sheets	4.00	4.00	4.00	3.495
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.913
Hot-rolled strip	3.25	3.25	3.265	2.775
Cold-rolled strip	4.038	4.038	4.063	3.535
Plates	3.40	3.40	3.42	2.93
Plates wrought iron	7.85	7.85	7.85	7.25
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$7.75	$7.75	$7.75	$6.70
Tinplate, electro (0.50 lb)	6.70	6.70	6.70	5.90
Special coated mfg. ternes	6.65	6.65	6.65	5.80
Bars and Shapes: (cents per pound)				
Merchant bars	3.35	3.35	3.37	2.875
Cold-finished bars	3.995	3.995	3.995	3.483
Alloy bars	3.75	3.75	3.75	3.213
Structural shapes	3.25	3.25	3.25	2.767
Stainless bars (No. 302)	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	8.65
Wire: (cents per pound)				
Bright wire	4.15	4.15	4.15	3.608
Rails: (dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$3.20	$2.725
Light rails	3.55	3.55	3.55	3.05
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$52.00	$52.00	$52.00	$45.00
Slabs, rerolling	52.00	52.00	52.00	45.00
Forging billets	61.00	61.00	61.00	54.00
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00
Wire rod and Skelp: (cents per pound)				
Wire rods	3.40	3.40	3.619	3.133
Skelp	3.25	3.25	3.25	2.888

Pig Iron: (per gross ton)	May 10, 1949	May 3, 1949	Apr. 12, 1949	May 11, 1948
No. 2, foundry, Phila.	$50.56	$50.56	$50.56	$44.85
No. 2, Valley furnace	46.50	46.50	46.50	39.50
No. 2, Southern Cin'ti*	*45.47*	46.80	49.47	43.97
No. 2, Birmingham	*39.38*	40.71	43.38	37.38
No. 2, foundry, Chicago†	46.50	46.50	46.50	39.00
Basic del'd Philadelphia*	49.74	49.74	49.76	44.35
Basic, Valley furnace	46.00	46.00	46.00	39.00
Malleable, Chicago†	46.50	46.50	46.50	39.50
Malleable, Valley	46.50	46.50	46.50	39.50
Charcoal, Chicago	73.78	73.78	73.78	62.55
Ferromanganese‡	173.40	173.40	173.40	145.00

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† The switching charge for delivery to foundries in the Chicago district is $1 per ton.

‡ Average of U. S. prices quoted on **Ferroalloy page**.

* Does not include interim increase on total freight charges, effective Jan. 11, 1949.

Scrap (per gross ton)	May 10, 1949	May 3, 1949	Apr. 12, 1949	May 11, 1948
Heavy melt'g steel, P'gh.	*$22.75*	$23.75	$24.75	$40.25
Heavy melt'g steel, Phila.	22.00	22.00	23.50	42.50
Heavy melt'g steel, Ch'go	23.50	23.50	22.50	39.25
No. 1, hy. comp. sh't, Det.	16.75	16.75	17.50	35.50
Low phos. Young'n.	24.75	24.75	27.50	45.25
No. 1, cast, Pittsburgh	*27.75*	28.50	36.50	64.00
No. 1, cast, Philadelphia	28.00	28.00	28.00	65.50
No. 1, cast, Chicago	*28.00*	29.00	31.00	73.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50	$14.50	$14.50	$12.50
Foundry coke, prompt	16.50	16.50	16.50	14.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	*18.00*	18.50	23.375	21.50
Copper, Lake Conn.	*18.625*	23.625	23.625	21.625
Tin, Grade A, New York	$1.03	$1.03	$1.03	94.00
Zinc, East St. Louis	*12.00*	12.50	15.00	12.00
Lead, St. Louis	*13.85*	14.80	14.80	17.30
Aluminum, virgin	17.00	17.00	17.00	15.00
Nickel, electrolytic	42.93	42.93	42.93	36.56
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	38.50	33.00

Composite Prices . .

Starting with the issue of May 12, 1949 the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive, see p. 139 of May 12, 1949 issue. The composite under the old method this week would have been 3.74583¢ per lb.

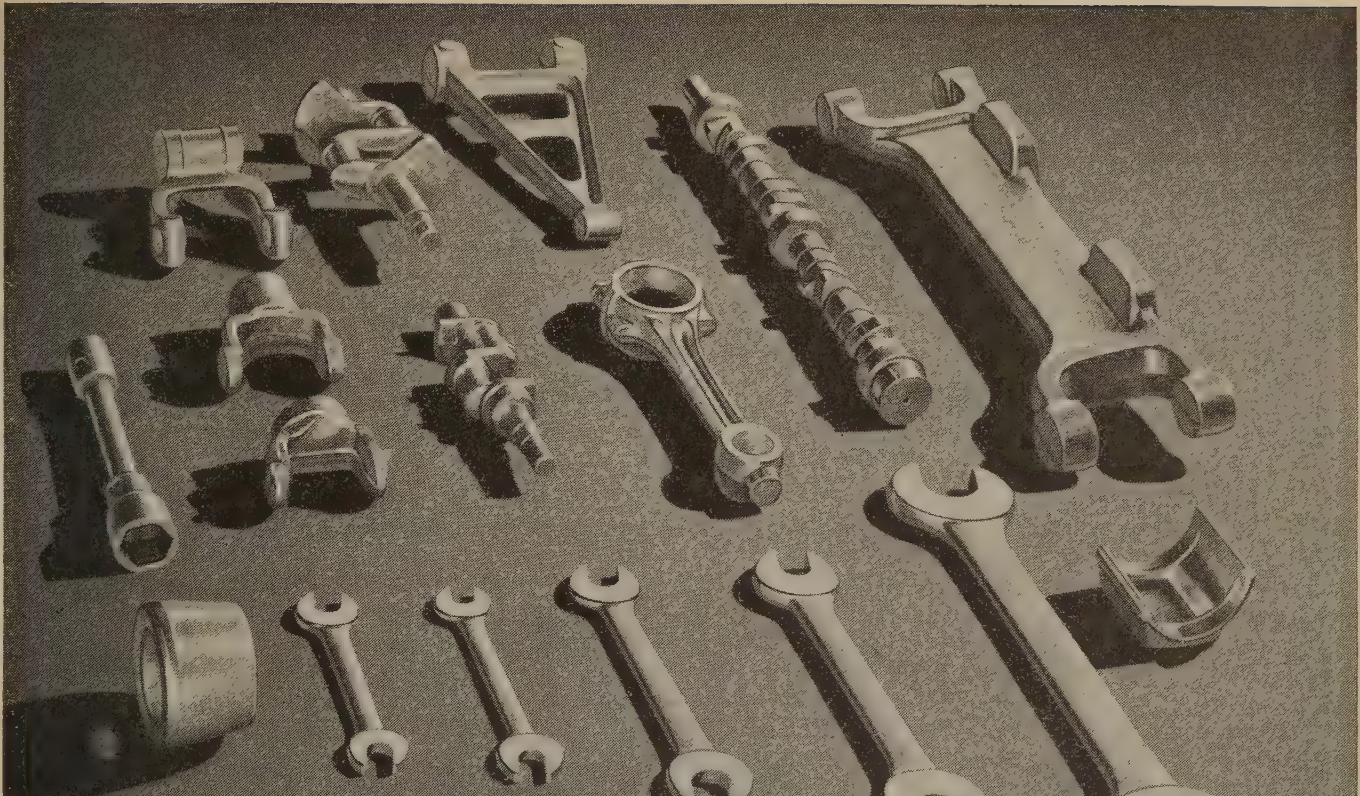
	FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
May 10, 1949	3.705¢ per lb.	*$45.91* per gross ton	*$22.75* per gross ton
One week ago	3.705¢ per lb.	$46.13 per gross ton	$23.08 per gross ton
One month ago	3.708¢ per lb.	$46.66 per gross ton	$23.58 per gross ton
One year ago	3.211¢ per lb.	$40.20 per gross ton	$40.66 per gross ton

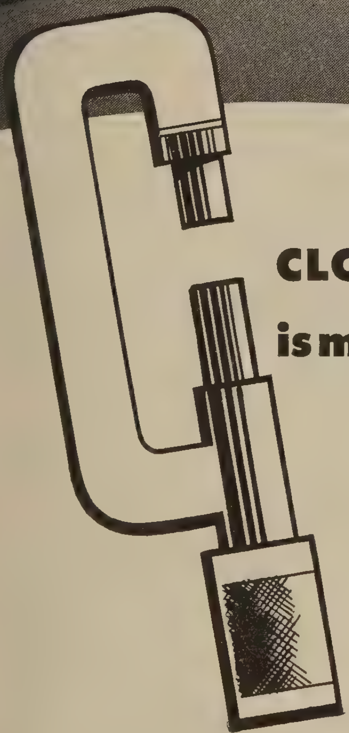
	HIGH	LOW	HIGH	LOW	HIGH	LOW
1949	3.720¢ Jan. 1	3.705¢ May 3	$46.82 Jan. 4	$45.91 May 10	$43.00 Jan. 1	$22.75 Apr. 19
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1046	2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.





CLOSE TOLERANCE UNIFORMITY

is maintained in every HERBRAND FORGING

You will find that you can reduce your machining and finishing operations when you employ Herbrand forged parts in your products. The latest, most modern facilities, including steam hammers, board hammers, forging machines, bending machines, heat treating and die making equipment, are used in the production of Herbrand precision forgings.

It is for this reason that you will find the Herbrand "Diamond H" trade mark on the vital forged parts of many of today's leading automobile and industrial equipment.

Whatever your requirements . . . upset or drop forgings . . . in any size or shape up to 200 lbs. . . . Herbrand is an excellent source of supply.

SINCE 1881

Herbrand

SUPER-QUALITY DROP FORGINGS

..the finest money can buy!

HERBRAND DIVISION

THE BINGHAM-HERBRAND CORP., FREMONT, OHIO

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Commercial quality sheet grade; prices, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 25¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb and over. (9) Carload lot in manufacturing trade. (10) Hollowware enameling, gages 29 to 31 only. (11) Produced to dimensional tolerances in AISI Manual Sec. 6. (12) Slab prices subject to negotiation in most cases. (13) San Francisco only. (14) Los Angeles only. (15) San Francisco and Los Angeles only. (16) Seattle only. (17) Seattle and Los Angeles only.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas														
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		Detroit	Johnstown	Seattle, S. Frisco, LosAngeles	Fontana
INGOTS Carbon forging	$50.00														
Alloy	$51.00						(per net ton)								
BILLETS, BLOOMS, SLABS Carbon, rerolling[12]	$52.00				$52.00	$52.00	(per net ton)						$52.00		
Carbon forging billets	$61.00	$61.00	$61.00	$61.00	$61.00	$61.00	(per net ton)						$61.00		
Alloy	$63.00	$63.00				$63.00	(Bethlehem, Canton, Massillon = $63.00) (per net ton)								
PIPE SKELP	3.25						3.25				Warren = 3.25				
WIRE RODS	3.40	3.40		3.40	3.40		3.40	3.50			Worcester 3.70		3.40	4.05[13] 4.20[14]	
SHEETS Hot-rolled[6]	3.25	3.25	3.25	3.25	3.25	3.25 (Consho	3.25 hocken,	3.25 Pa. 3.75)		Warren, Ashland = 3.25		3.45		3.95[15]	4.15
Cold-rolled[1]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.20	4.00	Warren 4.00	4.20		Pittsburg, Cal. 4.95	
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton =4.40	4.40	Ashland =4.40			5.15[15]	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long ternes[2] (10 gage)	4.80		4.80							4.80					
STRIP Hot-rolled[3]	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25		3.25	Warren = 3.25	3.45		4.00 to 4.25	4.65
Cold-rolled[4]	4.00	4.15		4.00		4.00	4.00	4.00		New Haven 4.50 Warren = 4.00 to 4.25		4.20 to 4.50			5.55
TINPLATE Cokes, 1.50 lb.[5] base box	$7.75	$7.75	$7.75		$7.85			$7.85	$7.95	Warren, Ohio =$7.75				Pittsburg, Cal.=$8.50	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct $1.30, $1.05 and 75¢ respectively from 1.50 lb. coke base box price														
TERNES MFG., specia: coated	Deduct $1.10 from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING 55 to 128 lb.	Deduct $2.00 from 1.50 lb. coke base box price														
BLACKPLATE, h.e., 29 ga.[10]	5.30	5.30	5.30					5.40		Warren, Ohio =5.30					
BARS Carbon Steel	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton =3.35	3.55	3.35	4.05	4.00
Reinforcing (billet)[7]	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton =3.35		3.35	4.05 to 4.10	4.00
Cold-finished[8]	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75	Bethlehem, Canton, Massillon=3.75				4.05	3.75	4.80[14]	4.75
Alloy cold-drawn	4.65	4.65	4.65	4.65		4.65	4.65	Massillon=4.65			Worcester 4.95				
PLATE Carbon steel[11]	3.40	3.40	3.40	3.40	3.40 Cons	3.45 hohocken	3.40 =3.55	3.45 Coatesville=3.50, Claymont=3.65 Geneva=3.40, Harrisburg=3.95				3.65	3.45	4.30[16]	5.30
Floor plates	4.55	4.55		4.55				Conshohocken=4.55							
Alloy	4.40	4.40							Coatesville=4.50						
SHAPES, Structural	3.25	3.25	3.25		3.25	3.30	Bethlehem=3.30, Geneva, Utah=3.25						3.30	3.80 to 3.90[16]	3.80
MANUFACTURERS' WIRE[9] Bright	4.15	4.15		4.15	4.15		4.15	4.25	Duluth=4.15, Worcester=4.45				4.15	5.15[13]	
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester=5.50 New Haven, Trenton=5.50				5.20	Duluth=5.20-6.15	
PILING, Steel sheet	4.05	4.05				4.05									

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

	Chromium Nickel							Straight Chromium		
Product	**301**	**302**	**303**	**304**	**316**	**321**	**347**	**410**	**416**	**430**
Ingots, rerolling	12.75	13.50	15.00	15.50	22.75	18.25	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	24.50	26.75	15.00	18.50	15.25
Forg. discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	36.50	41.00	24.50	25.00	25.00
Billets, forging	24.25	24.25	26.25	25.50	39.00	29.00	32.75	19.50	20.00	20.00
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	34.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.00	34.00	50.50	39.50	44.00	26.00	26.50-27.00	26.50
Sheets	37.50	37.50	39.50	39.50	53.00	45.50	50.00	33.00	33.50	35.50
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	34.50	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50	33.00	36.50	35.00	55.00	44.50	48.50	27.00	33.50	27.50

ELECTRODES

Cents per lb. f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	$1.42
18	4	2	—	—	$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢

High-carbon-chromium	52¢
Oil hardened manganese	29¢
Special carbon	26.5¢
Extra carbon	22¢
Regular carbon	19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

ELECTRICAL SHEETS

24 gage, HR cut lengths, f.o.b. mill

		Cents per lb
Armature	...	5.45
Electrical	...	5.95
Motor	...	6.70
Dynamo	...	7.50
Transformer 72	...	8.05
Transformer 65	8.60 to	10.60
Transformer 58	9.30 to	11.30
Transformer 52	...	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb	$3.20†
Joint bars, 100 lb	4.25
Light rails (from billets) per 100 lb	3.55

	Base Price cents per lb
Track spikes	5.35
Axles	5.20
Screw spikes	8.00
Tie plates	4.05
Tie plates, Pittsburg, Calif.*	4.20
Track bolts, untreated	8.25
Track bolts, heat treated, to railroads	8.50

*Seattle, add 30¢.

†CF&I, $3.30.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.00¢
0.41 to 0.60 carbon	5.50¢
0.61 to 0.80 carbon	6.10¢
0.81 to 1.05 carbon	8.05¢
1.06 to 1.35 carbon	10.35¢

Worcester, add 0.30¢.

CLAD STEEL

Base prices, cents per pound

Stainless clad	Plate	Sheet
No. 304, 20 pct, f.o.b.		
Coatesville, Pa.	*26.50	
Washington, Pa.	*26.50	*22.50
Claymont, Del.	*26.50	
Conshohocken, Pa.		*22.50
Nickel-clad		
10 pct f.o.b. Coatesville, Pa.	27.50	
Inconel-clad		
10 pct, f.o.b. Coatesville.	36.00	
Monel-clad		
10 pct, f.o.b. Coatesville.	29.00	
Aluminized steel sheets		
Hot dip, f.o.b. Butler, Pa.		7.75

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* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	*Pittsburg, Calif.*
Standard & coated nails*	103	123
Galvanized nails*	103	123
Woven wire fence†	109	132
Fence posts, carloads††	114	...
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire	123	...

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* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

	Base per 100 lb	*Pittsburg, Calif.*
Annealed fence wire‡	$4.80	$5.75
Annealed, galv. fencing‡	5.25	6.20
Cut nails, carloads‡‡	6.75	...

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‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.

‡‡ Less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	**Aldecor**	**Corten**	**Double Strength No. 1**	**Dynalloy**	**HI Steel**	**Mayari R**	**Otiscoloy**	**Yoloy**	**NAX High Tensile**
Producer	**Republic**	**Carnegie-Illinois, Republic**	**Republic**	**Alan Wood**	**Inland**	**Bethlehem**	**Jones & Laughlin**	**Youngstown Sheet & Tube**	**Great Lakes Steel**
Plates	5.20	5.20	5.20	5.30	5.20	5.30	5.20	5.20	5.85
Sheets									
Hot-rolled	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95	5.15
Cold-rolled	6.05	6.05	6.05	.....	6.05	6.05	6.05	6.05	6.25
Galvanized	.....	6.75	.....	.....	.....	6.75	.....	.....	.....
Strip									
Hot-rolled	4.95	4.95	4.95	.....	4.95	4.95	4.95	4.95	5.15
Cold-rolled	.....	.....	6.05	.....	.....	6.05	6.05	6.05	6.25
Shapes	.....	4.95	.....	.....	4.95	5.05	4.95	4.95	.....
Beams	.....	4.95	.....	.....	.....	.....	.....	.....	.....
Bars									
Hot-rolled	5.10	5.10	5.10	.....	5.10	5.10	5.10	5.10	5.40
Bar shapes	.....	5.10	.....	.....	5.10	5.10	5.10	5.10	.....

PIPE AND TUBING

Base discounts, f.o.b. mills,
Base price, $200.00 per net ton.

STANDARD, THREADED AND COUPLED

Steel, buttweld	*Black*	*Galv.*
½-in.	43 to 41	25½ to 23½
¾-in.	46 to 44	29½ to 27½
1-in.	48½ to 46½	32½ to 30½
1¼-in.	49 to 47	33 to 31
1½-in.	49½ to 47½	33½ to 31½
2-in.	50 to 48	34 to 32
2½ to 3-in.	50½ to 48½	34½ to 32½
Steel, lapweld		
2-in.	39½	25 to 23
2½ to 3-in.	43½ to 42½	27 to 26
3½ to 6-in.	46½ to 42½	30 to 26
Steel, seamless		
2-in.	38½ to 27	22 to 10½
2½ to 3-in.	41½ to 32½	25 to 16
3½ to 6-in.	43½ to 38½	27 to 22
Wrought Iron, buttweld		
½-in.	+20½	+47½
¾-in.	+10½	+36½
1 & 1¼ in.	+ 4½	+27½
2-in.	— 1½	+24
3-in.	— 2	+23½
Wrought Iron, lapweld		
2-in.	+ 7½	+31½
2½ to 3½-in.	+ 5	+27
4-in.	list	+21
4½ to 8-in.	+ 2	+22½

EXTRA STRONG, PLAIN ENDS

Steel, buttweld		
½-in.	42 to 40	26 to 24
¾-in.	46 to 44	30 to 28
1-in.	48 to 46	33 to 31
1¼-in.	48½ to 46½	33½ to 31½
1½-in.	49 to 47	34 to 32
2-in.	49½ to 47½	34½ to 33½
2½ to 3-in.	50 to 48	35 to 33
Steel, lapweld		
2-in.	39½ to 38½	24 to 23
2½ to 3-in.	44½ to 42½	29 to 27
3½ to 6-in.	48 to 44	32½ to 30½
Steel, seamless		
2-in.	37½ to 32½	22 to 17
2½ to 3-in.	41½ to 36½	26 to 22
3½ to 6-in.	45	29½
Wrought Iron, buttweld		
½-in.	+16	+41½
¾-in.	+ 9½	+34½
1 to 2-in.	— 1½	+23½
Wrought Iron, lapweld		
2-in.	+ 4½	+28
2½ to 4-in.	— 5	+16½
4½ to 6-in.	— 1	+21

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD in in.	Gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	$19.18	$22.56	$18.60	$21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

	Per net ton
6 to 24-in., del'd Chicago	$95.70
6 to 24-in., del'd N. Y.	$92.50 to 97.40
6 to 24-in., Birmingham	82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	109.30

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. & shorter	34
All diam, longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
½ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
1⅛ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	$61.75
In bulk	70.00

Large Rivets

	(½ in. and larger) *Base per* 100 *lb*
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

	(7/16 in. and smaller) *Pct off List*
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

(In packages)	*Pct Off List*
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	28

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

Effective CaF_2 Content:	*Base price per net ton*
70% or more	$37.00
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	$7.60
Old range, nonbessemer	7.45
Mesabi, bessemer	7.35
Mesabi, nonbessemer	7.20
High phosphorus	7.20

After Dec. 31, 1948, increases or decreases in Upper Lake freight, dock and handling charges and taxes thereon to be for the buyers' account.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 *mesh.*

Swedish sponge iron c.i.f. New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	31.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	90.0¢ to $1.78
Aluminum	30.00 to 31.00¢
Antimony	51.17¢
Brass, 10 ton lots	22.75 to 25.75¢
Copper, electrolytic	28.625¢
Copper, reduced	28.50¢
Cadmium	$2.40
Chromium, electrolytic, 99% min.	$3.50
Lead	21.65¢
Manganese	55.00 to 60.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	66.00¢
Nickel, spherical, minus 30 mesh, unannealed	68.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.00¢
Tin	$1.25
Tungsten, 99%	$2.90
Zinc, 10 ton lots	14.75 to 16.25¢

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.00 to $15.00
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $17.00
Foundry, Byproduct	
Buffalo, del'd	$22.95
Chicago, f.o.b.	20.40
Detroit, f.o.b.	19.40
New England, del'd	22.70
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	20.45
Swedeland, Pa., f.o.b.	20.40
Painesville, Ohio, f.o.b.	20.90
Erie, del'd	$21.50 to 23.50
Cleveland, del'd	22.45
Cincinnati, del'd	21.50
St. Paul, f.o.b.	23.50
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Carloads, Per 1000
First quality, Pa., Md., Ky., Mo., Ill. (except Salina, Pa., add $5)	$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	11.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	14.75
Silica cement, net ton, bulk, Utah and Calif.	21.00

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Chester	$69.00

Magnesite Brick

Standard, Balt. and Chester	$91.00
Chemically bonded, Balt. and Chester	80.00

Grain Magnesite

	Std. ⅜-in. grains
Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	$30.50 to 31.00
in sacks with fines	35.00 to 35.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢	$12.7

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb. (Metropolitan area delivery, add 15¢ to base price except Cincinnati and New Orleans (*), add 10¢; New York, add 20¢.)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Baltimore	5.31	6.21-6.41	6.95-7.11	5.37	....	5.56	5.36	5.42	6.16	....	9.60-10.10	....	....
Birmingham	5.05	....	6.45	5.05	6.68	5.25	5.00	5.00	6.68	....	....	....	....
Boston	5.55	6.45-6.75	7.11-7.61	5.65-5.95	6.75	5.80	5.42	5.52	6.27	9.67-9.79	10.04-10.07	11.23	11.47
Buffalo	4.85	5.75	7.43	5.30	7.27	5.35	5.10	5.05-5.15	5.90	9.60-9.70	9.85-9.95	11.15	11.40-11.45
Chicago	4.85	5.75	7.10	4.85	6.68	5.10	4.90	4.90	5.70	9.35	9.60	10.80	11.05
Cincinnati*	5.16-5.51	5.84-6.28	6.59-6.93	5.28-5.43	....	5.53-5.85	5.33	5.33-5.48	6.08-6.20	9.74	9.99	11.19	11.44
Cleveland	4.98-5.16	5.75-6.06	7.20-7.46	5.03-5.15	....	5.37-5.54	5.16-5.47	5.17-5.34	5.90-5.97	9.49	9.74	10.95	11.19
Detroit	5.28-5.32	6.07-6.18	7.53-7.58	5.28-5.47	6.27-6.58	5.53-5.57	5.40	5.33-5.55	6.01-6.10	9.67	9.92	11.11	11.35
Houston	6.70-6.95	....	7.30	6.70	....	6.70	6.20-6.70	6.40-6.65	7.60	10.45	10.40	11.45	11.70
Indianapolis	5.29	6.13	7.44	5.29	7.36	5.54	5.34	5.34	6.14	11.25	11.39	....	....
Los Angeles	6.45-6.65	7.75[19]-7.90[1]	8.05-8.75	6.65	8.35[5]-9.35[5]	6.15	5.95	6.10	7.95[14]	10.95[15]	10.90[15]-14.70	12.45[15]	12.70[15]-16.45
Memphis	5.75-5.80	6.60	7.20	5.80-5.95	6.80	5.95-6.00	5.75	5.75	6.53	....	....	....	....
Milwaukee	5.03	5.93	7.13-7.18	5.03-5.38	6.86	5.28	5.08	5.08	5.88	9.53	9.78	10.98	11.23
New Orleans*	5.95	6.75	....	6.15	....	6.15	5.95	5.95	6.65[6]	....	....	....	....
New York	5.40	6.46	7.00	5.62-5.72	....	5.70	5.33	5.57	6.36-6.41	9.73	9.98	11.18	11.43
Norfolk	6.00	....	....	6.20	....	6.05	6.05	6.05	7.05	....	....	....	....
Omaha	6.13	....	8.33	6.13	....	6.38	6.18	6.18	6.98	....	....	....	....
Philadelphia	5.17-5.71	6.34-6.46	7.23-7.28	5.44-5.55	6.69	5.38-5.50	5.10-5.55	5.40-5.55	6.19-6.34	9.49-9.50	9.74-9.75	10.95	11.20
Pittsburgh	4.85	5.75[1]	7.15	5.00	6.00	5.05	4.90	4.90	5.65	9.35	9.60	10.80	11.05
Portland	6.50[8]-6.90	8.00[1]	8.80-9.10	6.85[8]	....	6.30[8]	6.35[8]	6.35[8]	8.25[14]	10.50[6]	10.10[6]	....	....
Salt Lake City	7.05	8.20	7.90	7.50	....	6.40	6.80	7.10	8.30	....	....	....	....
San Francisco	6.15[8]	7.50[2]	7.90	6.75[8]	8.25[5]	6.35[8]	5.90[8]	5.90[8]	7.55	10.90[15]	10.85[15]	12.40[15]	12.65[15]
Seattle	6.70[4]	8.15[2]	8.80	6.70[4]	....	6.35[4]	6.30[4]	6.20[4]	8.15[14]	....	10.35[15]	....	13.10[15]
St. Louis	5.27-5.37	6.12[1]-6.27	7.32	5.22	6.68-7.54	5.47	5.27	5.27	6.07-6.22	9.72	9.97	....	11.42
St. Paul	5.44	6.19-6.34	7.64	5.44	6.82	5.64-6.69	5.49	5.49	6.29	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED:

Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED:

Sheets, 400 to 1999 lb; strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS:

1000 to 1999 lb.

GALVANIZED SHEETS:

450 to 1499 lb.

EXCEPTIONS:

(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb; (18) 1000 to 1499 lb; (19) 1500 to 3499 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight nor the 6 pct increase on total freight charges in the Eastern Zone (5 pct Southern Zone, 4 pct Western Zone). effective Jan. 11, 1949.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	.....	.....	.....	.....
Birmingham	38.88	39.38	.....	.....	.....
Buffalo	46.00	46.50	47.00	.....	.....
Chicago	46.00	46.50	46.50	47.00	.....
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	.....
Erie	46.00	46.50	46.50	47.00	.....
Everett	.....	52.50	53.00	.....	.....
Granite City	47.90	48.40	48.90	.....	.....
Ironton, Utah	46.00-47.00	46.50-47.50	.....	.....	.....
Lone Star, Texas	46.00	46.50†	.....	.....	.....
Neville Island	46.00	46.50	46.50	.....	.....
Geneva, Utah	46.00	46.50	.....	.....	.....
Sharpsville	46.00	46.50	46.50	47.00	.....
Steelton	48.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00	.....	.....	.....	.....
Swedeland	48.00	48.50	49.00	49.50	.....
Toledo	46.00	46.50	46.50	47.00	.....
Troy, N. Y.	.....	.....	.....	.....	54.00
Youngstown	46.00	46.50	46.50	.....	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	52.50	53.00	.....	.....
Boston	Steelton	6.27	54.27	54.77	55.27	55.77	60.27
Brooklyn	Steelton	5.48	.....	53.98	54.48	54.98	59.48
Cincinnati	Birmingham	6.09	44.97	45.47	.....	.....	....
Jersey City	Steelton	3.67	.. .	52.17	52.67	53.17	57.67
Los Angeles	Geneva-Ironton	7.13	53.13-54.13	53.63-54.63	.....	.....	.....
Mansfield	Cleveland-Toledo	3.03	49.03	49.53	49.53	50.03	54.03
Philadelphia	Bethlehem	2.17	50.17	.....	.....	.....	.....
Philadelphia	Swedeland	1.31	49.31	49.81	50.31	50.81	...
Philadelphia	Steelton	2.81	50.81	51.31	51.81	52.31	56.81
San Francisco	Geneva-Ironton	7.13	53.13-54.13	53.63-54.63	.....	.....	.....
Seattle	Geneva-Ironton	7.13	53.13-54.13	53.63-54.63	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....
Gulf Ports	Lone Star, Texas	......	50.50	51.00†			

† Low Phos, Southern Grade

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio—$59.50; f.o.b. Buffalo, $60.75. Add $1.00 per ton for each additional 0.50 pct Si up to 17 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $66.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $73.78. High phosphorus charcoal pig iron is not being produced.

FERROALLOY PRICES

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	$172
F.o.b. Johnstown, Pa.	$174
F.o.b. Sheridan, Pa.	$172
F.o.b. Etna, Pa.	$175

$2.00 for each 1% above 82% Mn; penalty, $2.00 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.45
Ton lots	12.05
Less ton lots	12.95

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$64.00	$65.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	8.95
Ton lots	10.60
Briquet, contract basis, carlots, bulk delivered, per lb of briquet	10.30
Ton lots	11.90
Less ton lots	12.80

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, $80.00; $78.50 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.30
Ton lots	7.90
Less ton lots	8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.

25% Si	18.50
50% Si	11.30
75% Si	13.50
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)

0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35

Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.

Carload, bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60.65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% max. C	1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium—Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60.65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25%Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Ton lots and carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5	$1.20
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	$2.90
Less ton lots	2.95
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo.	$1.10
Calcium molybdate, 45-50%, f.o.b. Langeloth, Pa., per pound contained Mo.	96¢
Molybdenum oxide briquets, f.o.b. Langeloth, Pa.; bags, f.o.b. Wash., Pa., per pound contained Mo.	95¢
Ferrotitanium, 40%, regular grade, 10% C max., f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.28
Ferrotitanium, 25%, low carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.40
Less ton lots	1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads, per net ton	$160.00
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per pound of alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	8.15¢
Ton lots	9.55¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk	11.00¢
Ton lots, packed	11.25¢
Less ton lots	11.75¢

Boron Agents

Contract prices per lb. of alloy, del.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lot	$1.20
F.o.b. Wash., Pa.; 100 lb. and over	
10 to 14% B.	.75
14 to 19% B.	1.20
19% min. B.	1.50
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y.; freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$6.25